

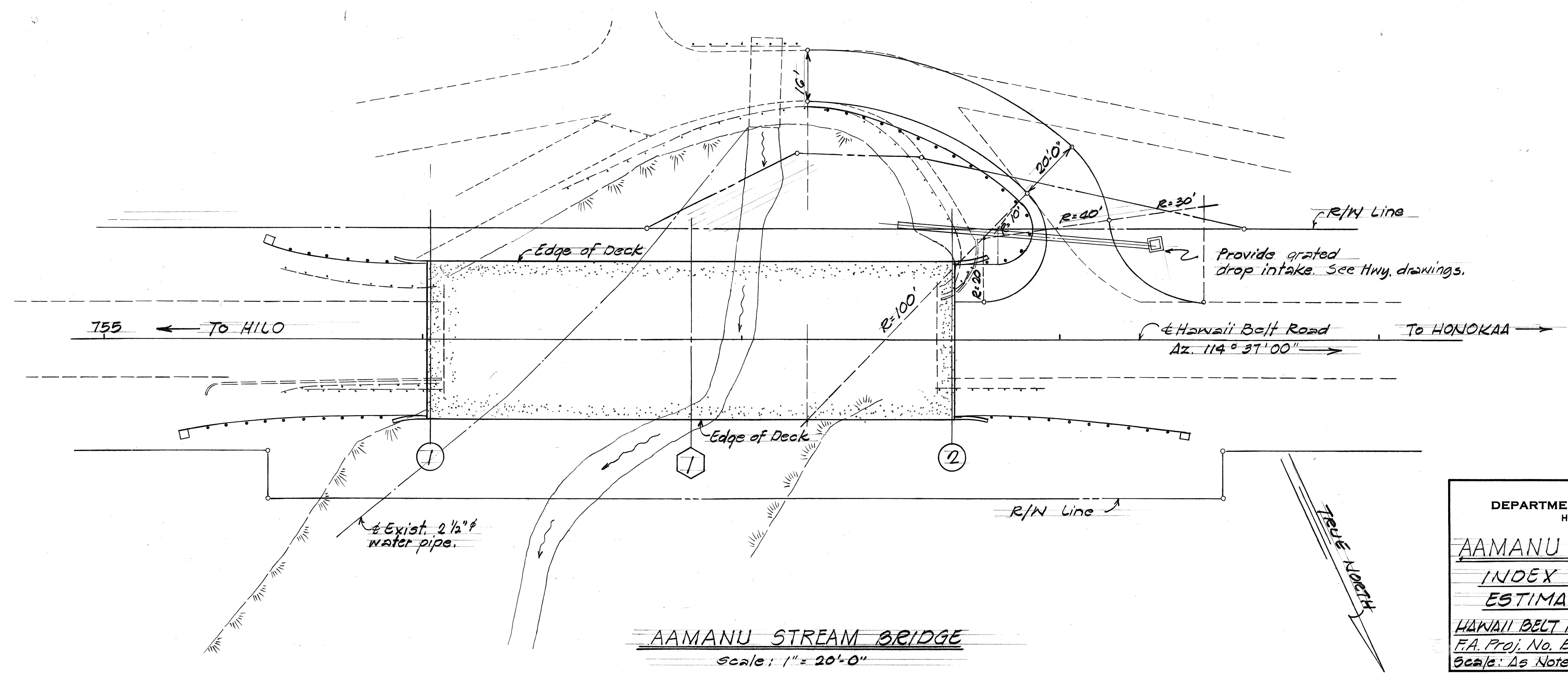
INDEX

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(18)	1981	20	63

SHEET NO.	DESCRIPTION
1	INDEX TO DRAWINGS ~ ESTIMATED QUANTITIES
2	GENERAL NOTES ~ SYMBOLS AND ABBREVIATIONS
3	LAYOUT PLAN, DECK FINISH GRADES, LONGITUDINAL DECK SECTION
4	FOUNDATION PLAN ~ BORING LOG
5	ABUTMENTS LINE ① & ② ~ PLAN & ELEVATIONS
6	ABUTMENTS LINE ① & ② ~ SECTIONS & DETAILS, TYPICAL END POST BRACKET DETAIL, CONCRETE SEAT ELEVATION & SLOPE SCH.
7	TYPICAL ABUTMENT SECTION, TYPICAL ABUTMENT & PIER STRUCTURE EXCAVATION & BACKFILL PAYLINE
8	PIER ① ~ COLUMN DETAILS & SECTION, FOOTING SECTION & DETAILS
9	PIER ② ~ CAP DETAILS & SECTION, CATWALK DETAILS
10	DECK FRAMING PLAN, PRESTRESSED GIRDER DETAIL, BEAM "B" DETAILS
11	NORMAL DECK SECTION ~ BAR PLACEMENT DIAGRAM
12	BEAM "A" & "C" DETAILS

SHEET NO.	DESCRIPTION
TD 1	TYP. DETAILS ~ CONG. SEATS, HINGE BLOCK & CREEP BLOCK
TD 2	TYP. DETAILS ~ PRESTRESSED GIRDER TYPE PG IV
TD 3	TYP. DETAILS ~ CONCRETE BRIDGE RAIL
TD 4	TYP. DETAILS ~ ALUMINUM BRIDGE RAILING {ONE RAIL COMBINATION TYPE ON PARAPET
TD 5	TYP. DETAILS ~ METAL GUARD RAIL CONNECTION {ONE RAIL COMBINATION TYPE END POST
DB-100	STANDARD DETAILS ~ NOTES & MISCELLANEOUS DETAILS
EB-1	EXISTING BRIDGE DRAWINGS ~ PLAN & LONGITUDINAL SECTION
EB-2	EXISTING BRIDGE DRAWINGS ~ BENT ELEVATION & DETAILS

(ESTIMATED QUANTITIES)			
ITEM NO.	ITEM	UNIT	QUANTITIES
206.6000	STRUCTURE EXCAVATION FOR BRIDGE	Cu. Yd.	1,438 C.Y.
206.7210	STRUCTURE BACKFILL FOR BRIDGE ABUTMENTS	Cu. Yd.	401 C.Y.
206.8201	FILTER MATERIAL FOR BRIDGE	Cu. Yd.	20 C.Y.
501.0211	STRUCTURAL STEEL FOR AAMANU STREAM BRIDGE CATWALK	Lump Sum	1,856 LBS.
503.1090	CONCRETE IN AAMANU STREAM BRIDGE (EXCEPT FOOTINGS)	Lump Sum	513 C.Y.
503.1091	CONCRETE IN FOOTINGS FOR AAMANU STREAM BRIDGE	Lump Sum	198 C.Y.
504.4100	TYPE IV PRESTRESSED CONCRETE GIRDER	Lump Sum	1,323 L.F.
507.1000	METAL BRIDGE RAILING ONE RAIL ON PARAPET	Lin. Ft.	337 L.F.
507.7000	CONCRETE BRIDGE PARAPET, INCL. END POST	Lin. Ft.	377 L.F.
602.0090	REINFORCING STEEL IN AAMANU STREAM BRIDGE	Lump Sum	259,823 LBS.
202.0440	REMOVAL OF EXISTING STRUCTURE (INCLUDING CONCRETE PIER FOOTING)	Lump Sum	
507.4510	GALVANIZE IRON PIPE RAILING AND POST FOR CATWALK	Lump Sum	95 L.F.



AAMANU STREAM BRIDGE
Scale: 1" = 20'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

AAMANU STREAM BRIDGE
INDEX TO DRAWINGS & ESTIMATED QUANTITIES

HAWAII BELT ROAD
FA Proj. No. BRF-019-2(18)
Scale: As Noted

SHEET No. 1 OF 12 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

GENERAL NOTES

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(18)	1981	21	63

DESIGN SPECIFICATIONS AASHTO:

Standard Specifications for Highway Bridges (12th Edition)
with subsequent interim specifications.

DESIGN LOADS:

H5-20-44 or Interstate loading.

DESIGN STRESSES:

1. Cast in place reinforced concrete - see AASHTO specifications and Special Provisions except as otherwise noted.

Class A & B0 All Others

$f'_c = 3,000 \text{ psi}$ 5,000 psi

$f_c = 1,200 \text{ psi}$ 2,000 psi

$n = 9$ 6.6

$f_s = \text{ASTM A615}$, see Special Provisions.

2. Prestressed concrete:

Girders $\left\{ \begin{array}{l} f'_c = 5,500 \text{ psi at 28 days.} \\ f_{ci} = 4,000 \text{ psi at transfer.} \end{array} \right.$

3. Prestressed strands shall be 270 ksi ultimate strength 7 wire, stress-relieved steel strands, $\frac{1}{2}" \phi$ (area = 0.153 in²) for girders;

Initial strand stress (before any losses) = 180 ksi
Initial loss = 18,000 psi
Total loss other than friction = 45,000 psi

MATERIALS:

1. Except as otherwise noted on plans:
 - a. 1. Bridge deck slab concrete shall be Class 10D.
 2. Pier column footing concrete shall be 5,000 psi.
 3. All other concrete shall be Class A.
 - b. Reinforcing steel for cast-in-place concrete shall be ASTM A615 Grade 40 or as otherwise noted.
 - c. Concrete for precast prestressed concrete girders - see standard specifications and as noted under Design Stresses.
2. Concrete in precast prestressed concrete girders shall have a cement content of not less than 7.0 sacks but no more than 8.5 sacks per cubic yard.
3. All elastomeric bearing pads, neoprene preformed fabric bearing pads, premolded joint filler and vertical restrainer assemblies incidental to concrete and shall not be paid for separately.
4. See specifications for admixture in concrete.

CONSTRUCTION METHOD:

1. see Standard Specification for Road & Bridge Construction, 1976 Edition and Special Provisions.
2. In general, top of concrete deck of superstructure shall be constructed to follow the finish roadway vertical and horizontal curves and grades. See Highway plans.
3. For concrete finish, see Special Provisions. Girder concrete seats, hinge and creep blocks to be poured monolithically with the supporting structures. Top surfaces of concrete seats to have hard trowel finish.
4. Except as otherwise noted, all vertical dimensions are measured plumb.
5. Abutment and Pier Footing shall be excavated and poured neat against undisturbed ground. In case of over excavation, space between footing and ground shall be filled with concrete at the Contractor's expense and as directed by the Engineer. The minimum quality of the fill concrete shall be Class D.
6. No demolition work on the existing bridge structure shall commence until the detour road has been completed.

REFERENCE:

1. Refer to Standard Detailed Drawings for additional details not covered by detailed and typical drawings.

GENERAL:

1. All items noted incidental will not be paid for separately.
2. The Contractor shall verify the locations of all existing utility lines and notify their respective owners before commencing work.
3. The Contractor shall provide shop placement and detailed drawings of the following items at each construction phase for approval by the Engineer:
 - a. Pier column and pier cap reinforcement.
 - b. All reinforcing steel locations of required mechanical splice couplings.
4. All preformed elastomeric bearing pads and preformed fabric bearing pads shall be secured against displacement with adhesives approved by the Engineer.
5. Except as otherwise noted on plans, all exposed exterior corners 90° or less shall be chamfered $\frac{3}{4}" \times \frac{3}{4}"$. All exposed exterior corners greater than 90° shall not be chamfered. Round all finish corners $\frac{1}{4}"$ radius unless noted otherwise.
6. Exact location of bars shall be so arranged so that no interference will occur between vertical column reinforcement and bottom pier cap horizontal reinforcement.
7. All falsework and bracing schemes for all phases of construction shall be prepared by or under the supervision of an Engineer who is registered as a Structural Engineer in the State of Hawaii.

SYMBOLS AND ABBREVIATIONS

Detail or section designation	Deck slab main reinforcement direction between supports.	① ② Location concrete seat line number
sht. no. sct. is cut or det. location	↙ ↘	⊕ Boring number and designation.
(A) 4 6	(E) - Expansion (F) - Fixed	① Pier column number
A Adj. - Adjacent	E Exist. - Existing	R R - Radius
Abut. - Abutment	Exc. - Excavation	Ref. - Reference
Alt. - Alternate	Ext. - Exterior	Reinf. - Reinforcement
Alum. - Aluminum		Rt. - Right
Approx. - Approximate	F Fin. - Finish	Ret. - Retaining
Az. - Azimuth	Ftg. - Footing	Req'd - Required
B Bal. - Balance	G Galv. - Galvanize	S Symm. - Symmetrical
Bet. - Between		Sht. - Sheet
Bot. bott. - Bottom	H h - Height	Sta. - Station
Bm, bm - Beam	Horiz. - Horizontal	Stirr. - Stirrups
	Hwy - Highway	Sect. - Section
C Cl. - Clear		Std. - Standard
Cont. - Continuous	I Inv. - Invert	Struct. - Structure
Const. - Construction	Int. - Interior	Str. - Straight
Contr. - Control		Specs. - Spaces
Comp. - Composition	J Jt. - Joint	
Corresp. - Corresponding		I Typ. - Typical
Conc. - Concrete	L Lq. - Long	TSS - Top Slab Strip Reinforcement Type
Col. - Column	Longit. - Longitudinal	
CL - Center Line	Lt - Left	
c.c. - Center to Center		
D Det. - Detail	M Max. - Maximum	V Vert. - Vertical
Diag. - Diagonal	Min. - Minimum	N W.P. - Working Paint
E Ea. - Each	N No. # - Number	
Eq. - Equal		
El. - Elev. - Elevation	P Pg. IV - Prestressed	
E.P. - Edge Pavement	Girder Type	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

AAMANU STREAM BRIDGE

GENERAL NOTES, SYMBOLS AND ABBREVIATIONS

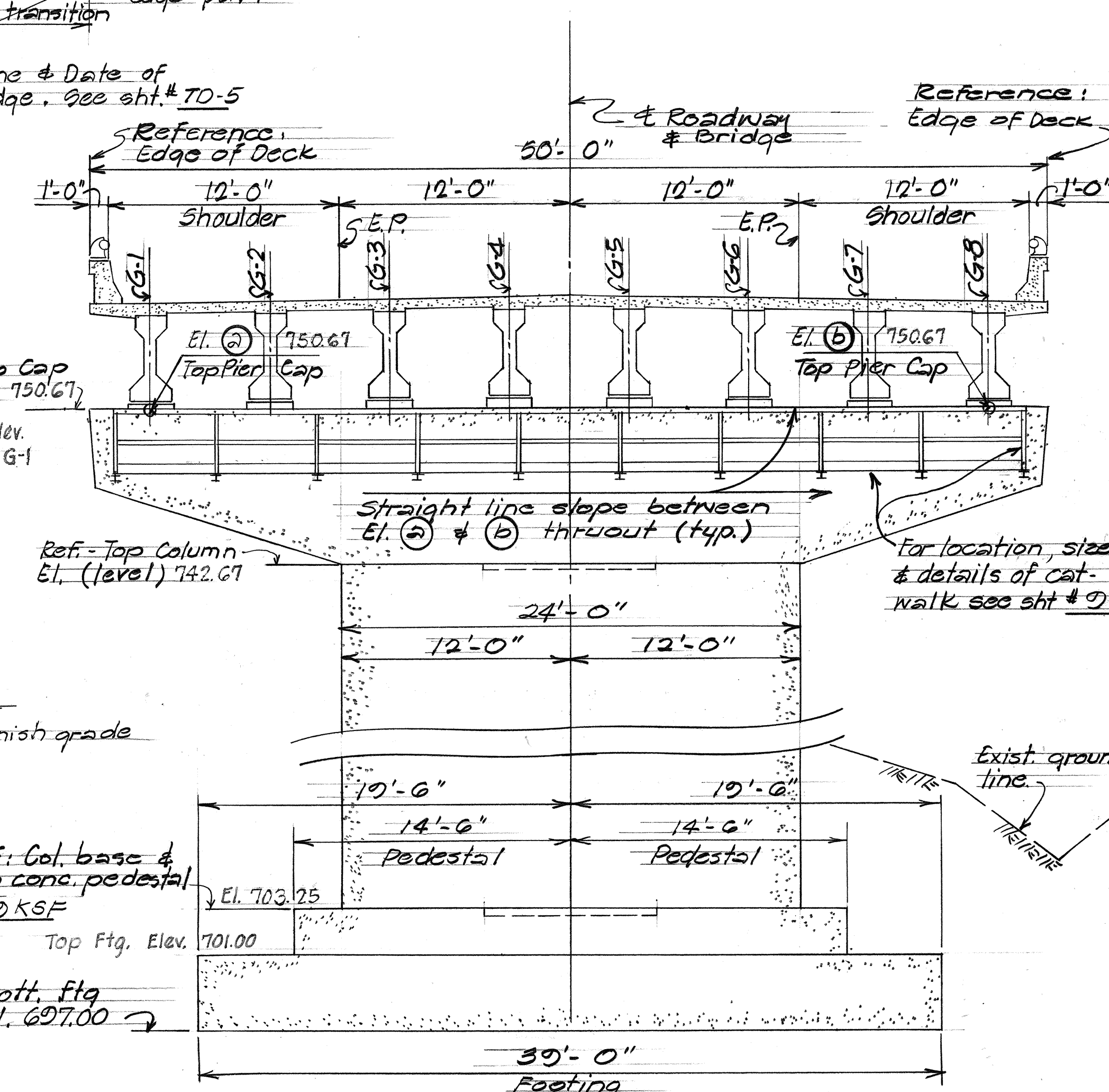
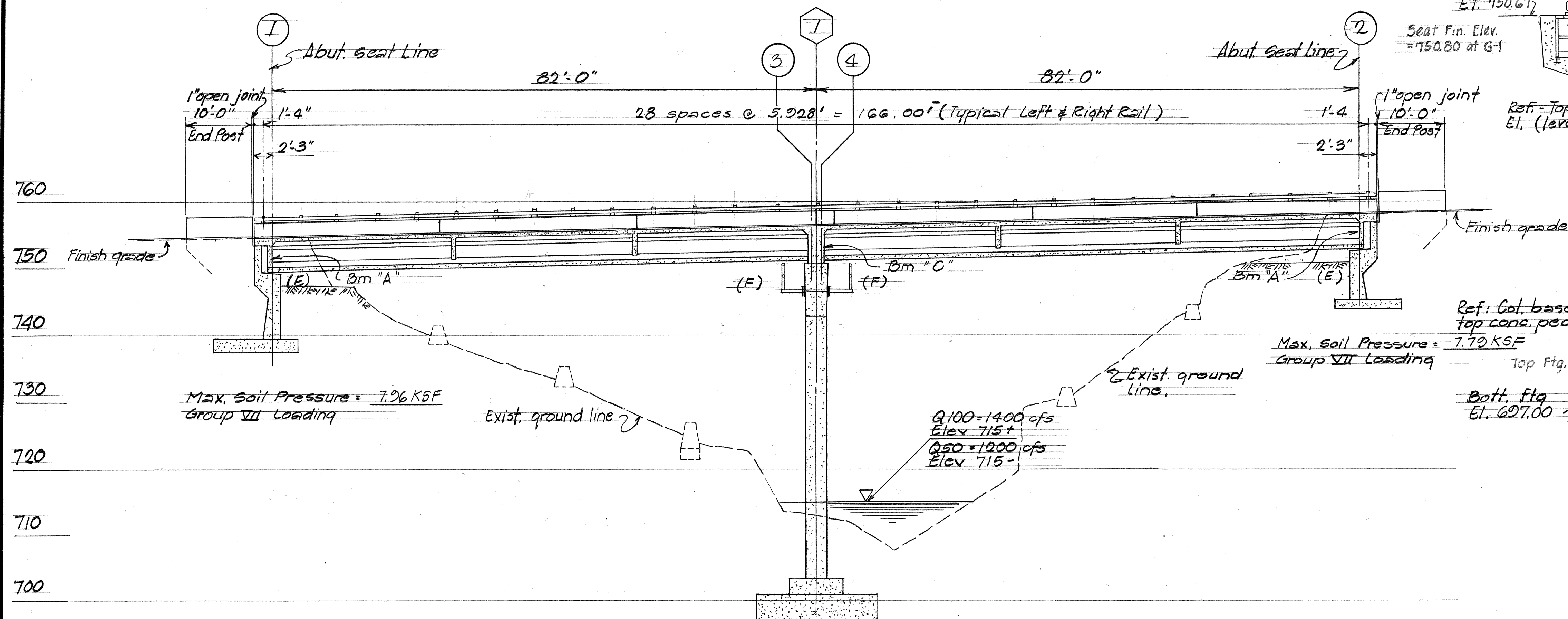
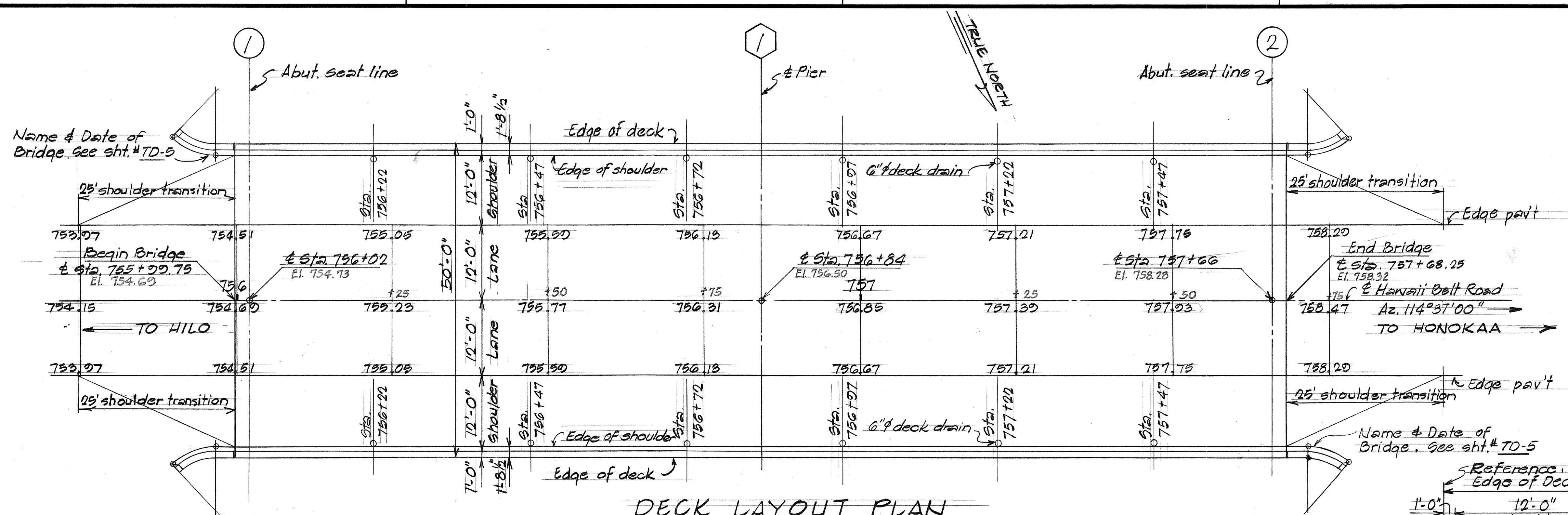
HAWAII BELT ROAD

FA Proj. No. BRF-019-2(18)

Scale: As noted

SHEET NO. 2 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(18)	1981	22	63

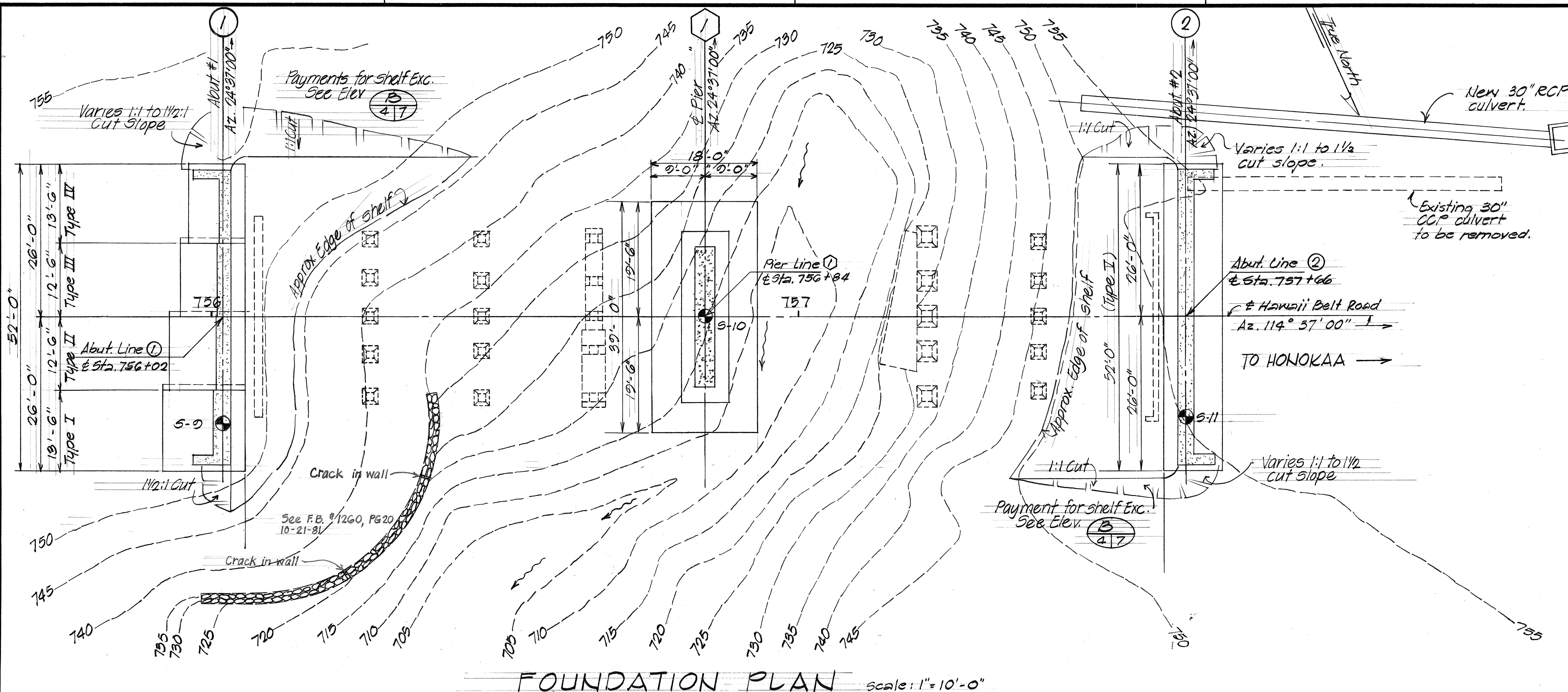


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

AAMANU STREAM BRIDGE
LAYOUT PLAN & LONGITUDINAL DECK SECTION
HAWAII BELT ROAD
F.A. Proj. No. BRF-019-2(18)
Scale: As noted

SHEET NO. 3 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(18)	1981	23	63



FOUNDATION PLAN Scale: 1" = 10'-0"

NOTE:

- 1- The boring data furnished in these plans are the results of the facts gathered at the specific locations indicated to primarily aid in the design of the structure, and does not necessarily typify conditions at other locations.
- 2- The Department assumes no responsibility for sufficiency of boring data or the prevalence of conditions similar to that indicated by the boring data.

S-9 Elev. 752.32

750	Soft brown clay (Ash) w/trace of gravel.
740	Shelby 4 blows/ft.
730	Shelby 10 blows/ft.
720	Firm brown clay (Ash) w/trace of gravel.
710	Shelby 16 blows/ft.
700	Highly weathered rock.
690	Moderately wea. ves. bas. rock w/2 little highly weathered rock.
680	Nx = 80% rec.
	Moderately & highly weathered rock.
	Nx = 44% rec.
	Mod. & highly weathered rock (fractured) & a trace of slightly wea. ves. bas. rock (boulder).
	Nx = 24% rec.
	Moderately & highly weathered rock.
	Nx = 28% rec.
	Highly weathered rock.
	Split spoon 32 blows/ft.

S-10 Elev. 713.50

710	Soft brown clay w/gravel & stones.
700	Firm brown & gray clay w/gravel & stones.
690	Split spoon 22 blows/ft.
680	Stiff brn clay w/str. of gray clay & HNR.
	Nx = 80% rec.
	Stones.
	Nx = 40% rec.
	Gravel & stones.
	HNR Nx = 23% rec.
	Split spoon 25 blows/ft.
	Firm brown clay w/some gravel.
	Moderately wea. ves. bas. rock.
	Slightly wea. ves. bas. rock (fractured).
	Nx = 100% rec.
	Unweathered dense bas. rock (fractured).
	Nx = 90% rec.
	Nx = 80% rec.
	Moderately & highly weathered rock.

S-11 Elev. 755.80

750	Soft brown clay (Ash) w/some gravel.
740	Shelby 3/0.5 - 5/0.5 - 30/0.5 blows/ft.
730	Firm brown clay (Ash).
720	Stone.
710	Firm brn clay w/str. of gravel & stones.
700	Split spoon 56 blows/ft.
690	Highly weathered rock.
680	Split spoon 10/0.5 - 60/0.5 - 5/0.0 blows/ft.
	Split spoon 20/0.0 blows/ft.
	Nx = 74% rec.
	HNR & mod. wea. ves. bas. rock.
	Nx = 80% rec.
	HNR w/some mod. wea. ves. bas. red rock.

BORING LOG

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

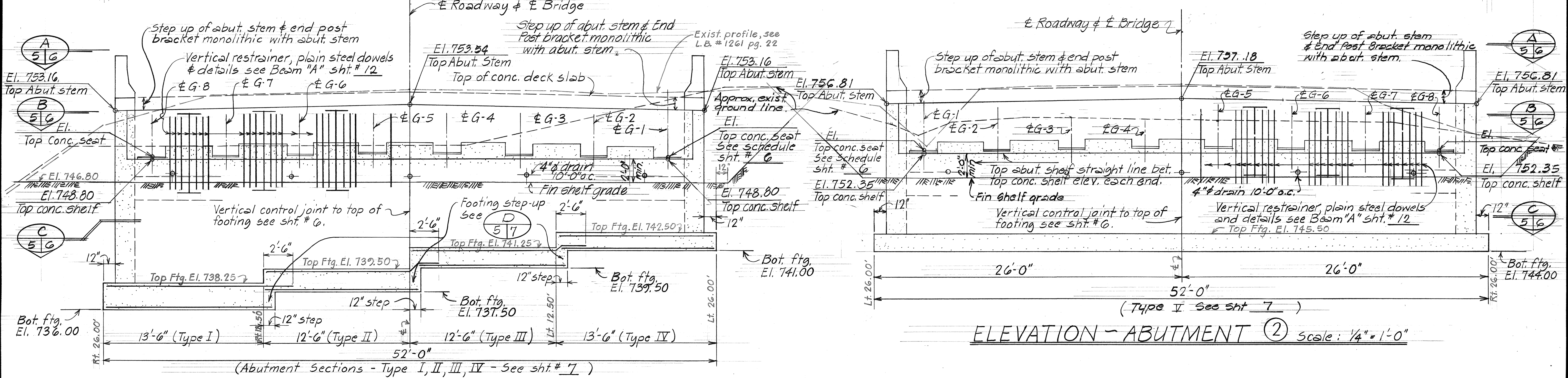
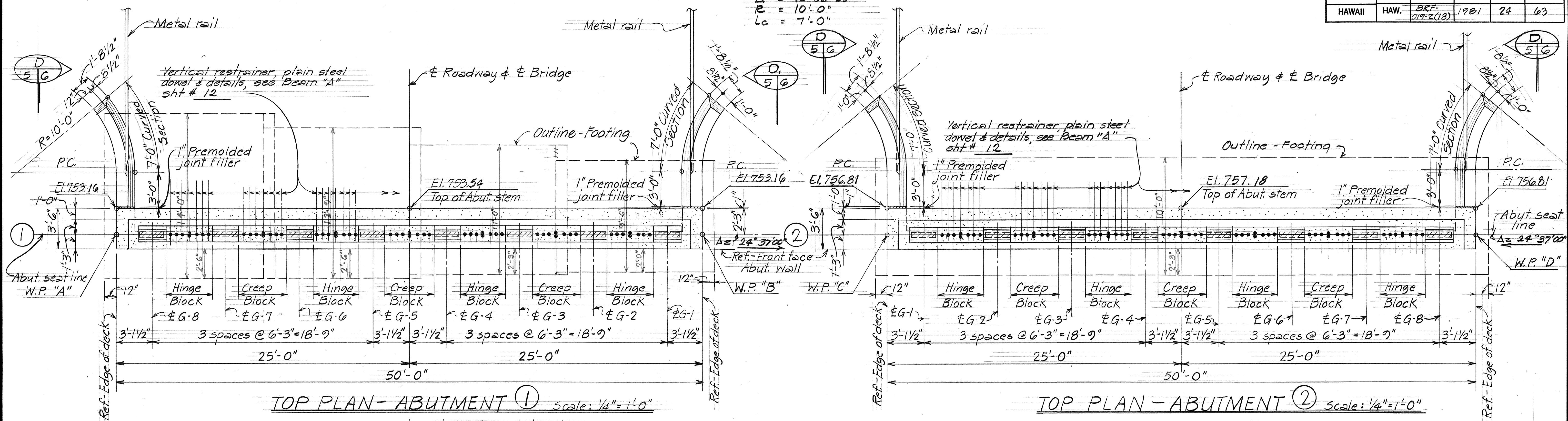
AAMANU STREAM BRIDGE
FOUNDATION PLAN & BORING LOG

HAWAII BELT ROAD
FA Proj. No. BRF-019-2(18)
Scale: As noted

SHEET No. 4 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(18)	1981	24	63

CURVE DATA
 $\Delta = 40^\circ 06' 25''$
 $R = 10' 0''$
 $L_c = 7' 0''$



- NOTE:**
1. Bridge deck & superstructure not shown.
 2. For concrete seat, hinge block & creep block detail see sht # TD-1
 3. For concrete End Post Detail see sht # 6.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

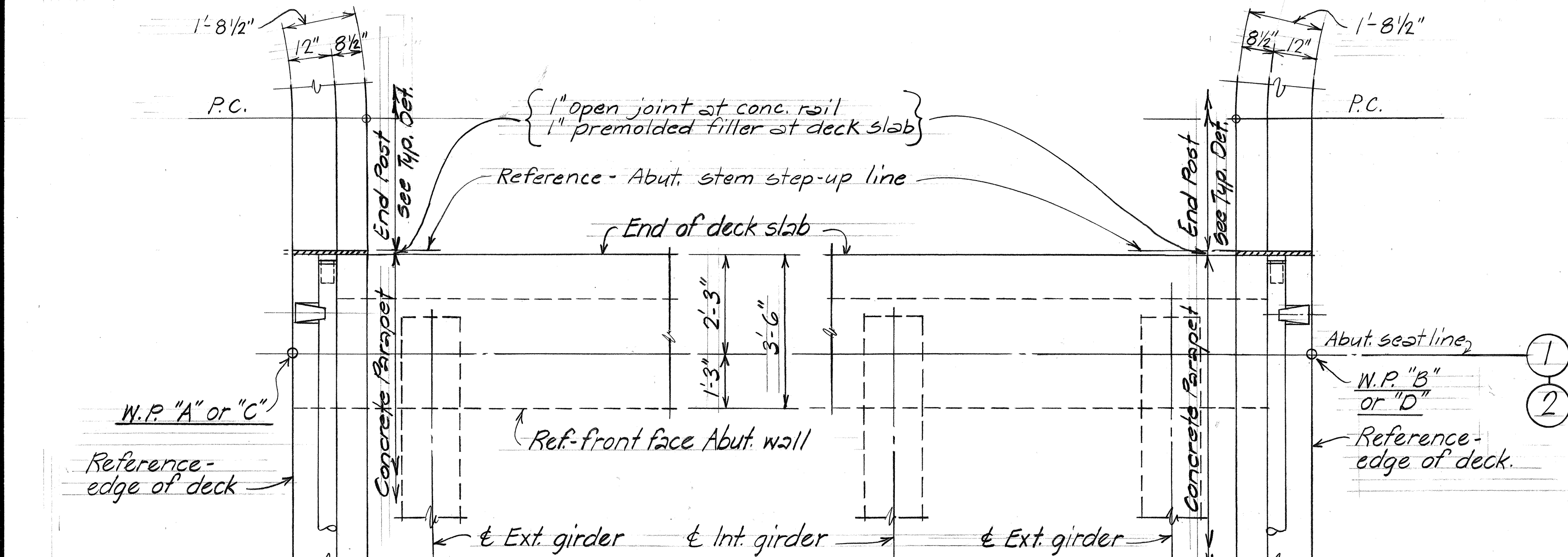
AAMANU STREAM BRIDGE
ABUTMENT ① & ②
PLAN AND ELEVATION

HAWAII BELT ROAD
FA Proj. No. BRF-019-2(18)
Scale: As noted

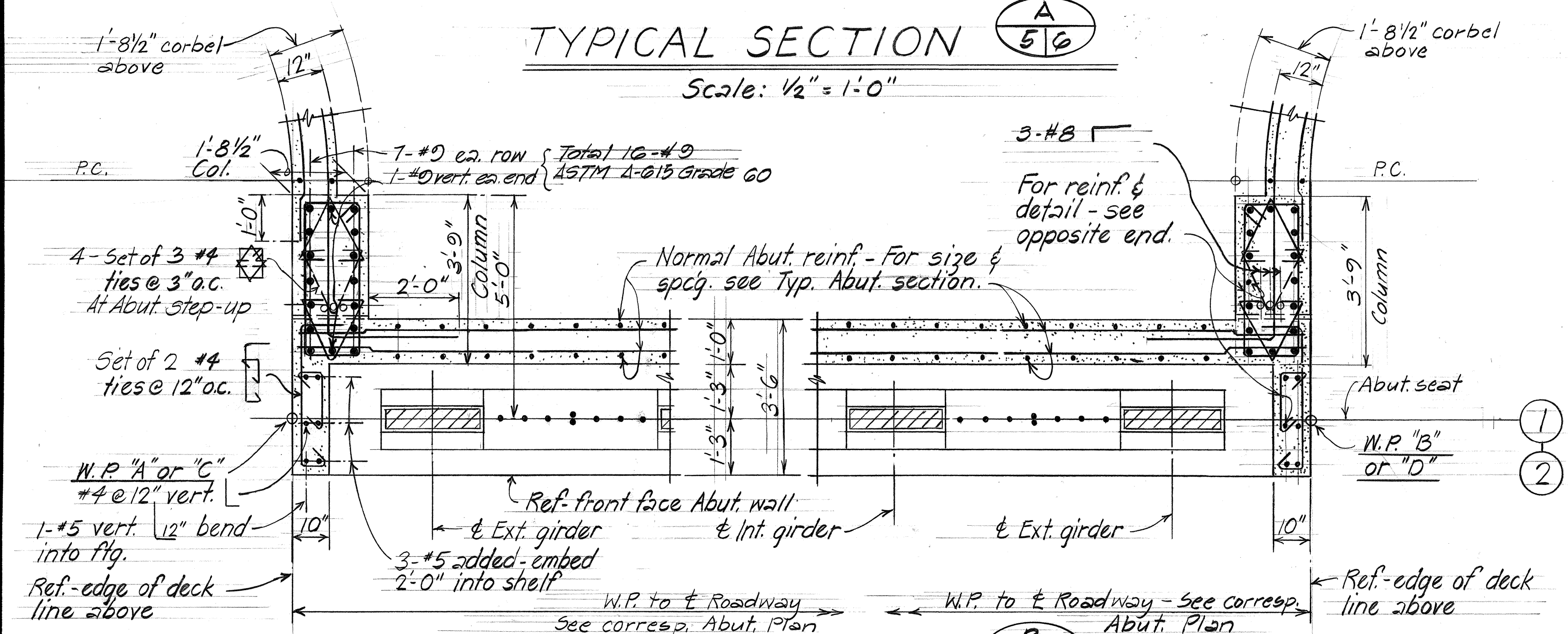
SHEET No. 5 OF 12 SHEETS

DATE	
DRAWN BY	L.M.
DESIGNED BY	D.O.
QUANTITIES BY	J.M., L.M., E.K.
CHECKED BY	C.R.Y.
ORIGINAL PLAN	
NOTE BOOK	
No.	

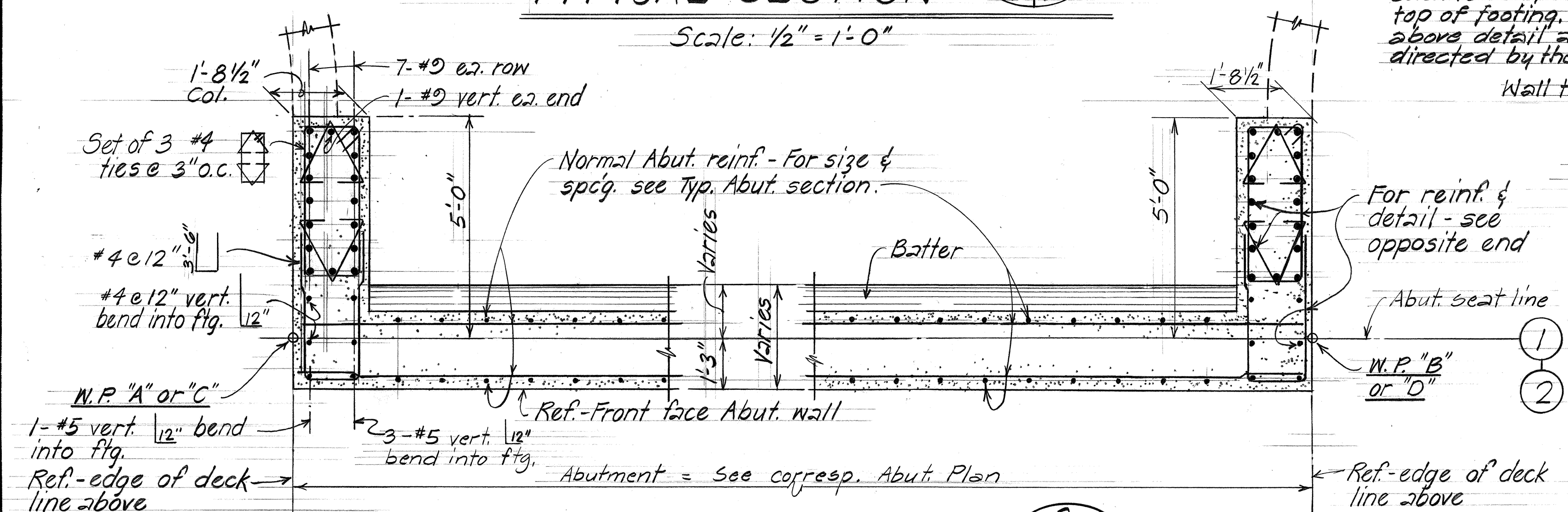
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HAWAII	HAW.	BRF-019-2(18)	1981	25	63



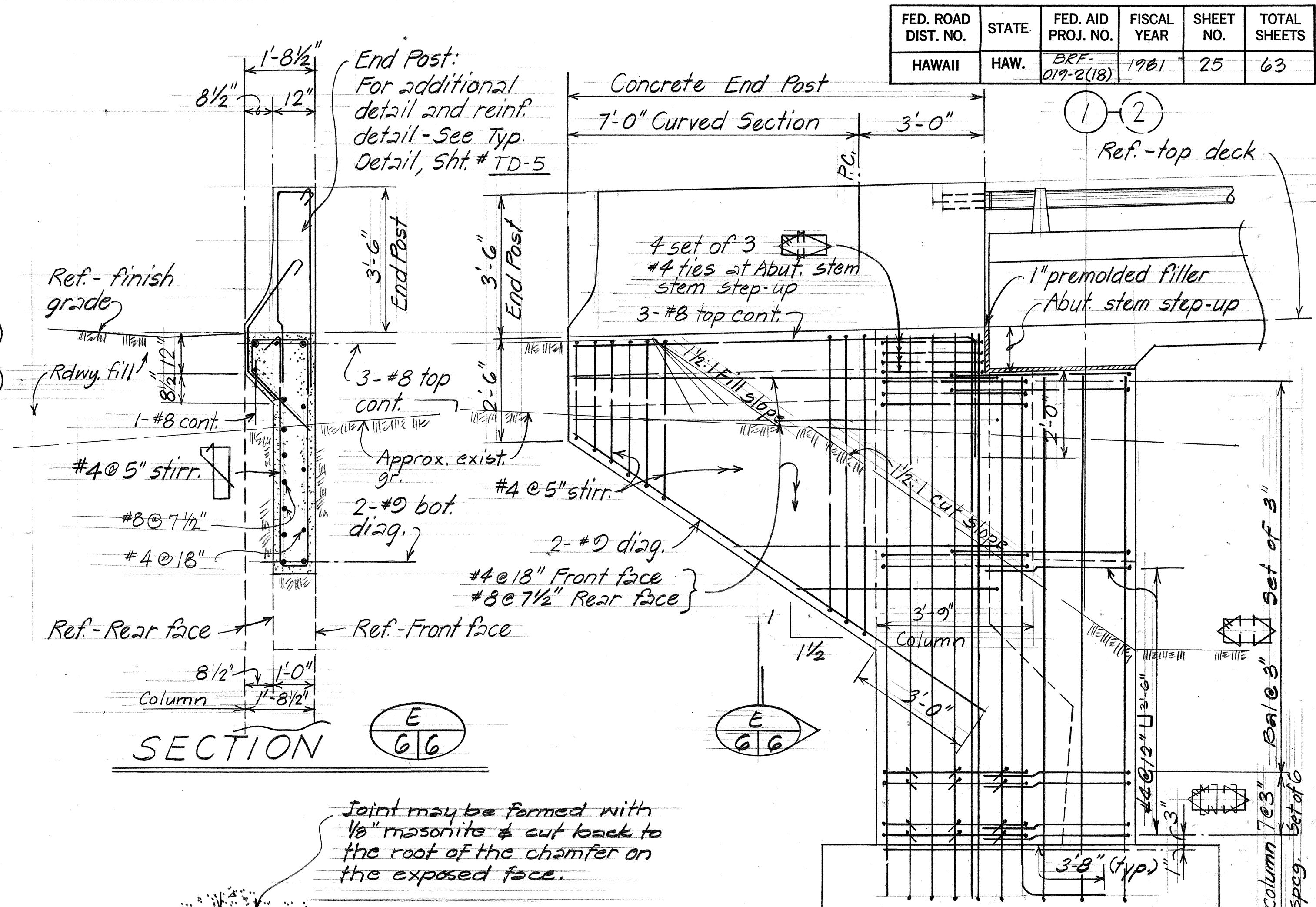
TYPICAL SECTION
Scale: 1/2" = 1'-0"



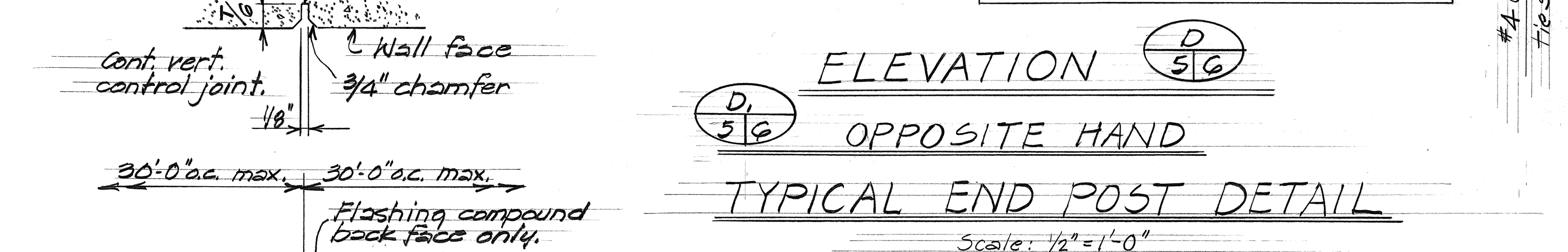
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Scale: 1/2" = 1'-0"



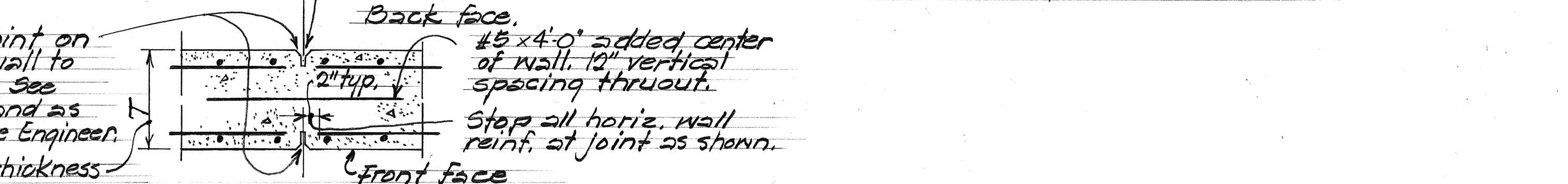
TYPICAL SECTION
Scale: 1/2" = 1'-0"



SECTION
E 6/6



ELEVATION
D 5/6
OPPOSITE HAND
TYPICAL END POST DETAIL
Scale: 1/2" = 1'-0"



CONTROL JOINT DETAILS
Scale: No Scale

GIRDER TOP CONCRETE SEAT ELEVATION AND SLOPE SCHEDULE (AT & BEARING)									
LOCATION	ABUTMENT LINE	DIRECTION	①	③	④	DIRECTION	ABUTMENT LINE	②	
G-1	748.92	↑ 0°32'12"	750.80	750.85	↑ 0°4'12"	752.47			
G-2	749.10	↑	750.97	751.03	↑	752.65			
G-3	749.19		751.07	751.12		752.74			
G-4	749.29		751.16	751.22		752.84			
G-5	749.29		751.16	751.22		752.84			
G-6	749.19		751.07	751.12		752.74			
G-7	749.10	↓	750.97	751.03	↓	752.65			
G-8	748.92	↑ 0°32'12"	750.80	750.85	↑ 0°4'12"	752.47			

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
AAMANU STREAM BRIDGE
ABUT. LINE ① & ② SECT. & DET.
TYP. END POST BRACKET DET.
CONC. SEAT ELEV. & SLOPE SCH.
HAWAII BELT ROAD
F.A. Proj. No. BRF-019-2(18)
Scale: AS NOTED
SHEET NO. 6 OF 12 SHEETS

DATE: _____
DRAWN BY: _____
DESIGNED BY: _____
CHECKED BY: _____
NOTED BY: _____
ORIGINAL PLAN: _____
NOTE BOOK: _____
QUANTITIES BY: _____
CHECKED BY: _____
NO. _____

Note: Waterproofing assemblage incidental to concrete.

1" premolded filler. See Abut. section

1" chamfer

$\frac{1}{8}$ " x 12" neoprene bonded, 3" min. on ea. side of joint

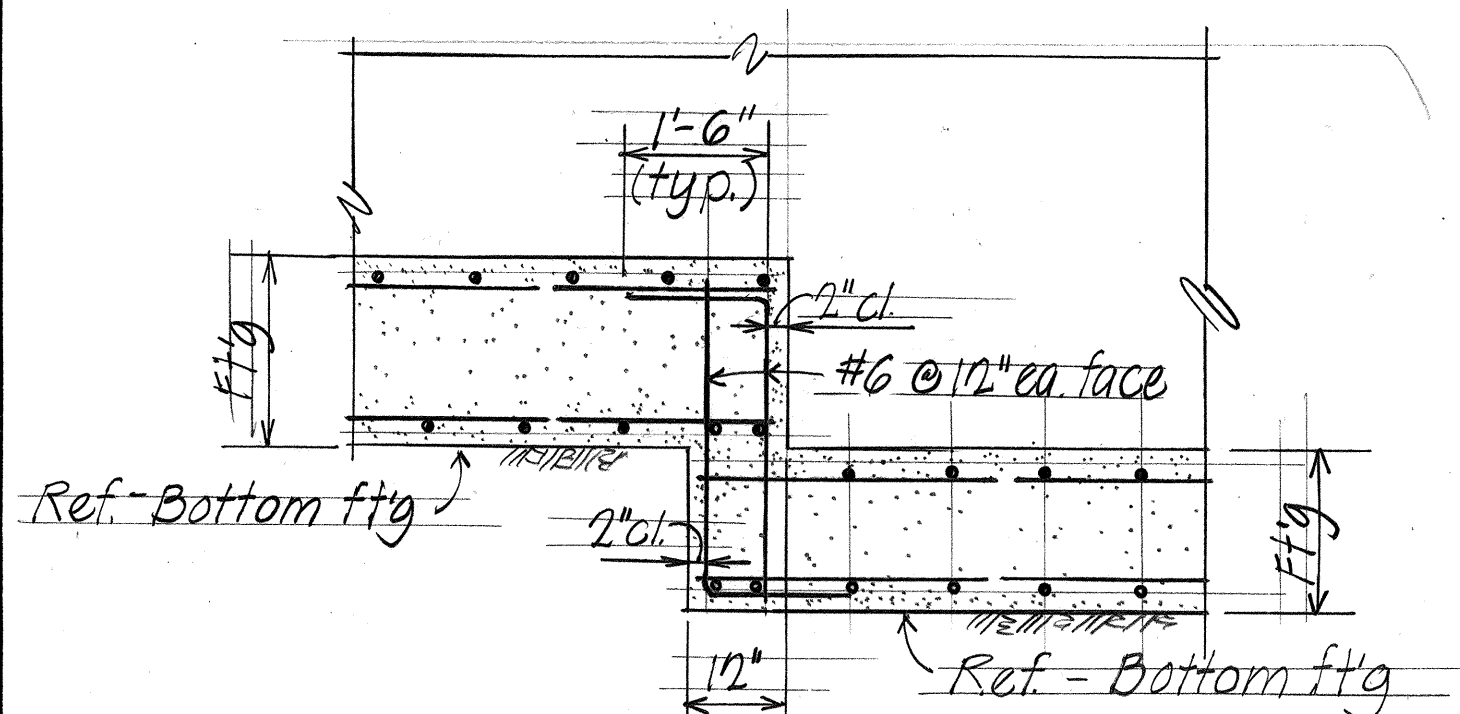
Fold neoprene into depression.

Ref. - Top Abut. stem

Protective cover (Hardboard or suitable material)

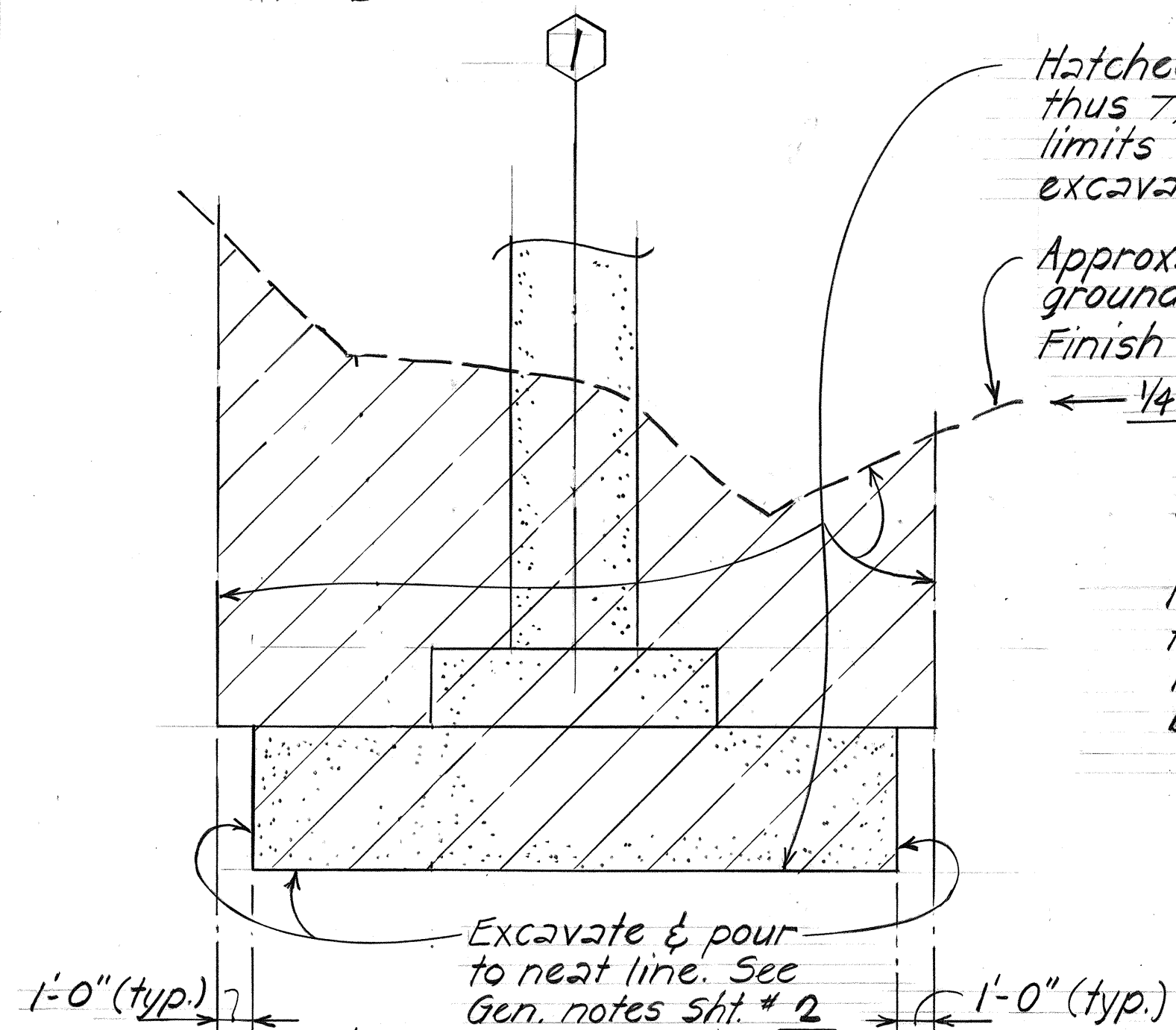
Ref. - Rear face of Abut. stem.

TYPICAL WATERPROOFING DETAIL
No scale



STEP-UP DETAIL

Scale: $\frac{1}{2}'' = 1'-0''$

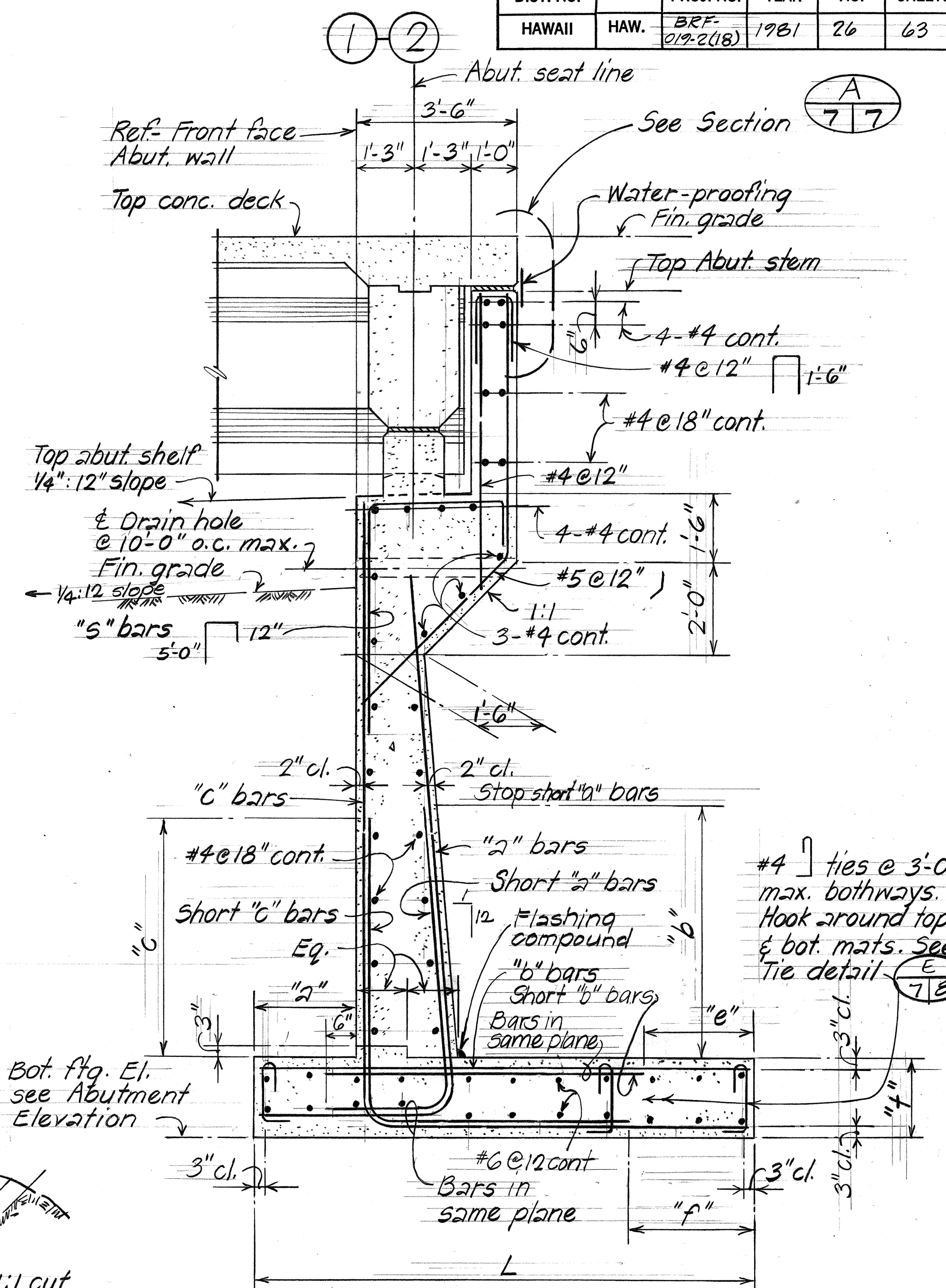


AT ABUTMENT

TYPICAL STRUCTURE EXCAVATION & BACKFILL - PAYLIMITS No Scale

ABUT. TYPE	TYPE I	TYPE II	TYPE III	TYPE IV	TYPE V
L	14'-0"	12'-0"	11'-0"	9'-6"	10'-0"
"a"	2'-6"	2'-6"	2'-3"	2'-0"	2'-3"
"t"	2'-3"	2'-0"	1'-0"	1'-6"	1'-6"
"b"	8'-6"	7'-3"	5'-6"	4'-0"	4'-0"
"c"	8'-3"	7'-0"	5'-3"	4'-0"	4'-6"
"e"	3'-6"	3'-0"	3'-3"	2'-0"	2'-3"
"f"	4'-3"	4'-3"	3'-3"	2'-6"	2'-0"
"a" bars	#11 @ 13"	#10 @ 12"	#9 @ 12"	#8 @ 12"	#8 @ 11"
Short "a" bars	#11 @ 13"	#10 @ 12"	#9 @ 12"	#8 @ 12"	#8 @ 11"
"c" bars	#9 @ 10"	#8 @ 10"	#8 @ 12"	#7 @ 11"	#7 @ 10"
Short "c" bars	#9 @ 10"	#8 @ 10"	#8 @ 12"	#7 @ 11"	#7 @ 10"
"b" bars	#9 @ 11"	#8 @ 11"	#7 @ 11"	#6 @ 12"	#6 @ 10"
Short "b" bars	#9 @ 11"	#8 @ 11"	#7 @ 11"	#6 @ 12"	#6 @ 10"
"s" bars	#6 @ 5"	#6 @ 5"	#6 @ 6"	#6 @ 5 1/2"	#6 @ 5"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF- 019-2(18)	1981	26	63



TYPICAL ABUTMENT SECTION

Scale: $\frac{1}{2}'' = 1' - 0''$

ELEVATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

AAMANU STREAM BRIDGE

TYPICAL ABUTMENT SECTION

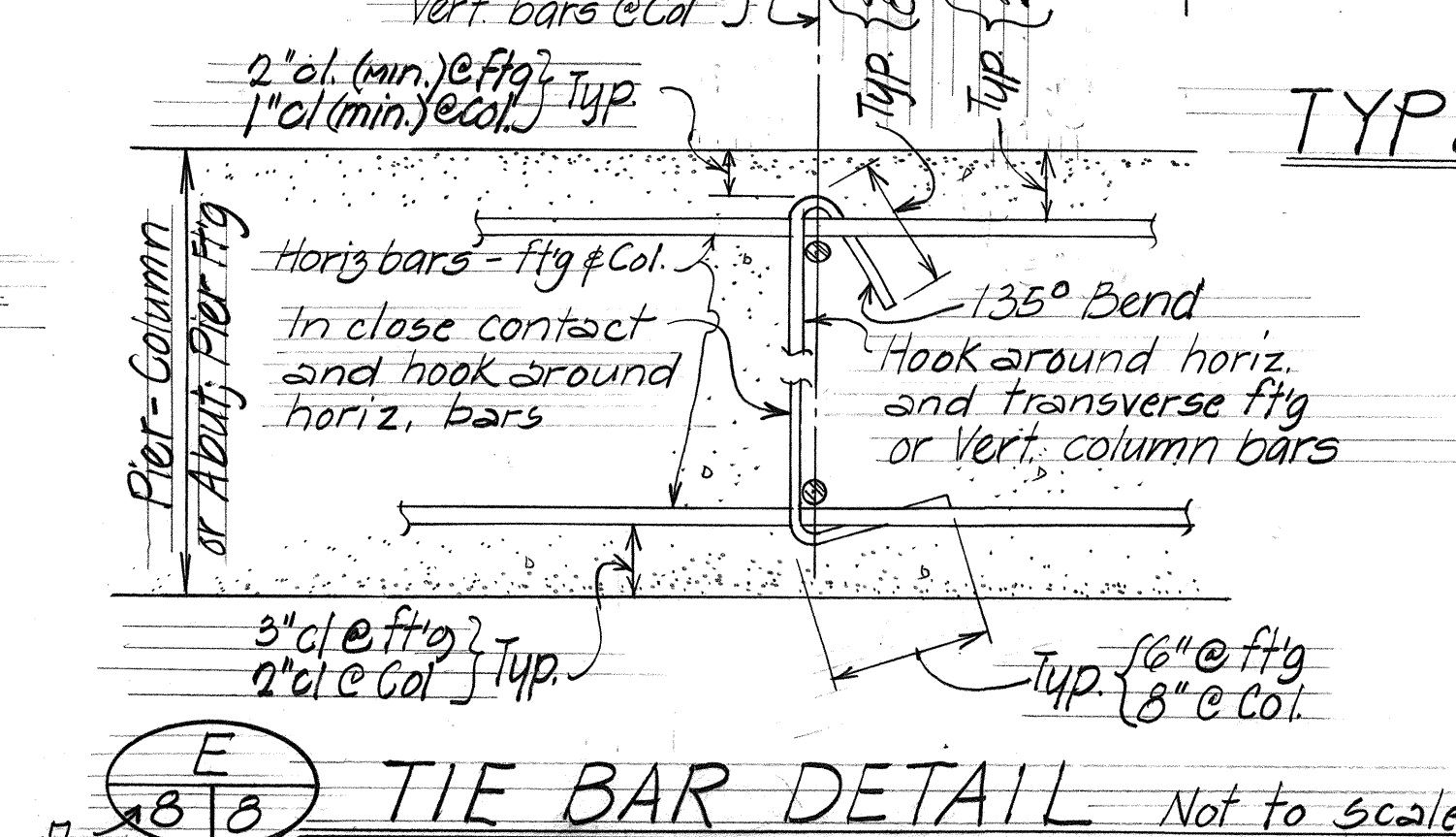
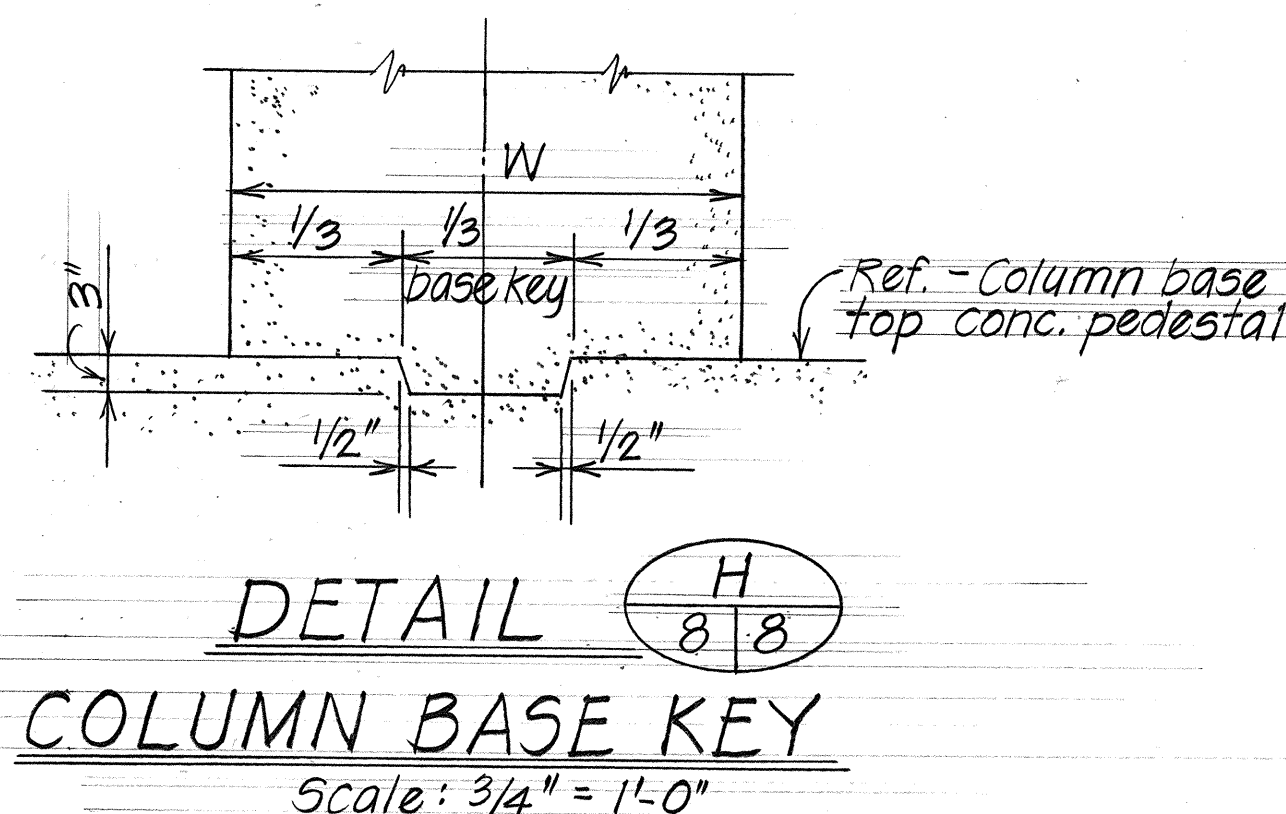
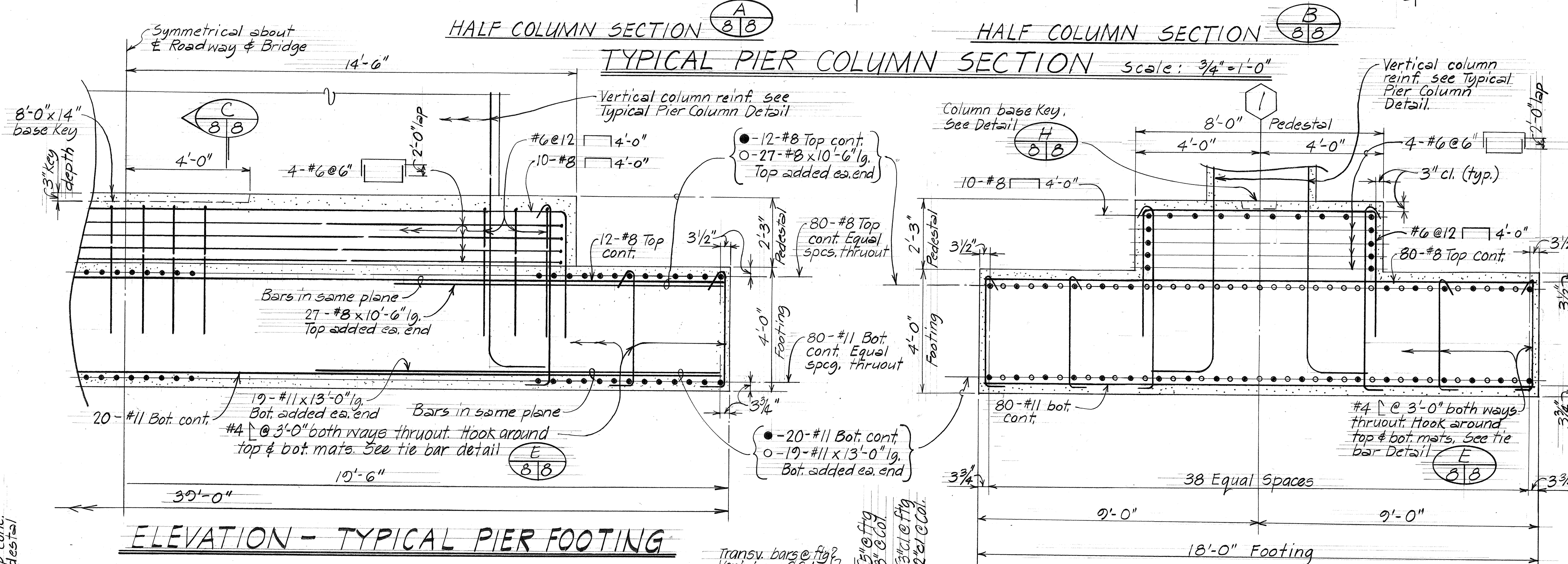
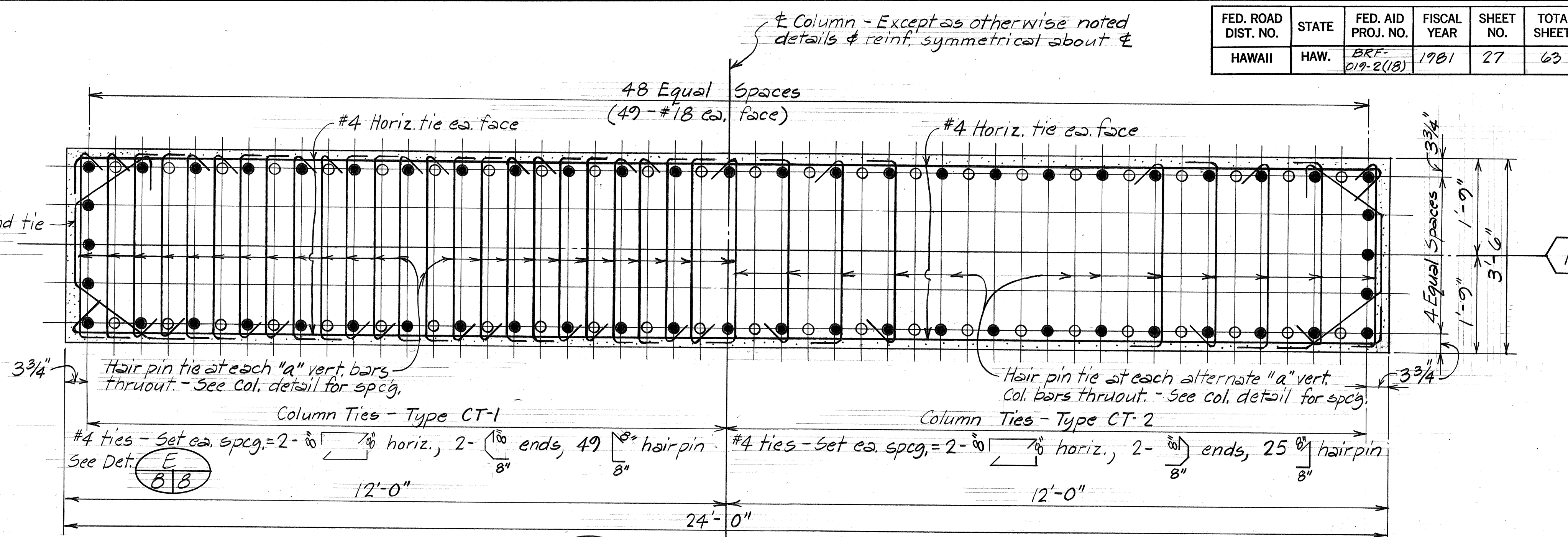
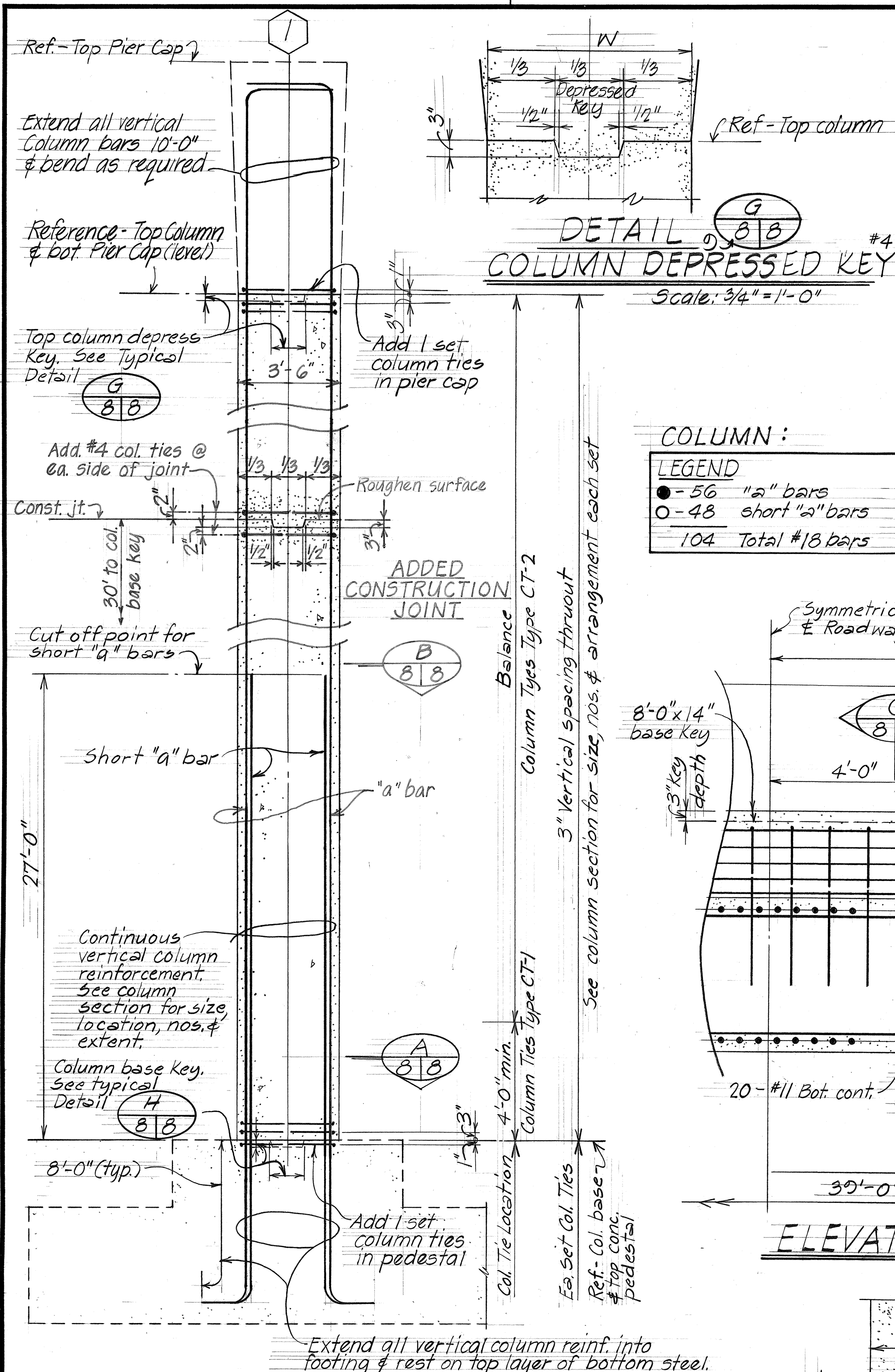
TYPICAL ABUTMENT & PIER

STRUCTURE EXC. & BACKFILL PAYLINE
HAWAII BELT ROAD

F.A. Proj. No. BRF-019-2(18)

SHEET No. 7 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEET
HAWAII	HAW.	BRF- 019-2(18)	1961	27	63



TYPICAL PIER COLUMN DETAIL
Not to scale

Note: 1. All pier column & footing reinforcement shall be ASTM A-615 Grade 60.

DETAIL 

COLUMN BASE KEY

Scale: $\frac{3}{4}'' = 1'-0''$

TYPICAL SECTION  Scale: $\frac{1}{2}'' = 1'-0''$

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

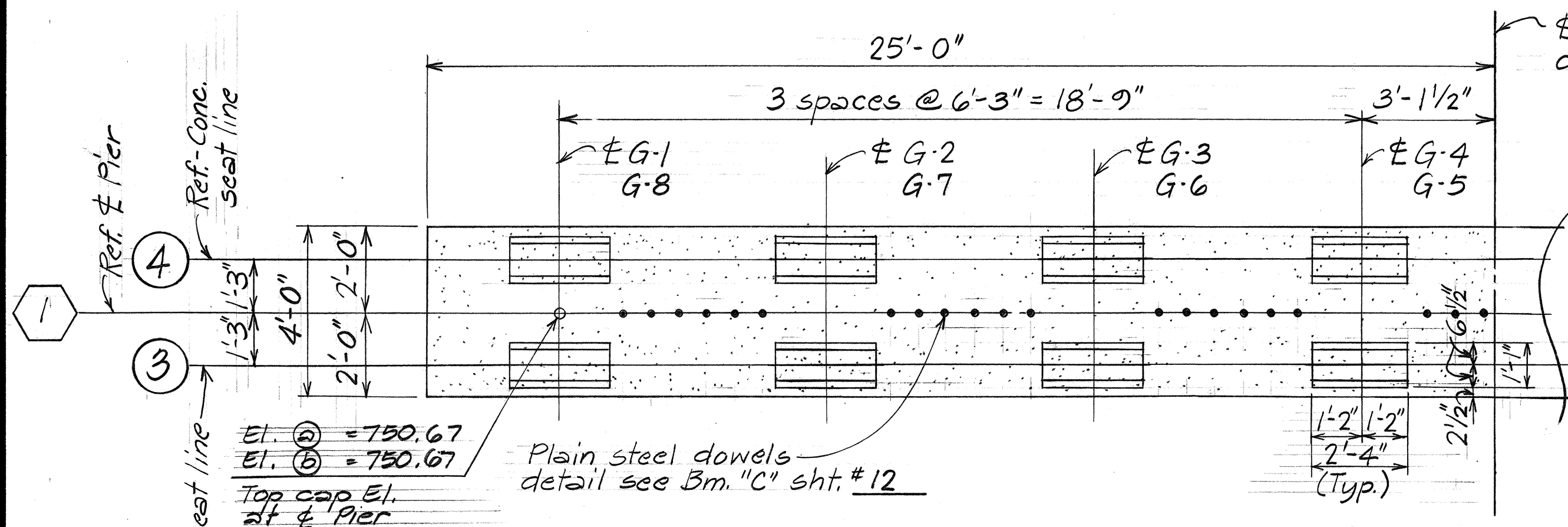
AAMANU STREAM BRIDGE
PIER COLUMN DETAILS
AND PIER FOOTING SECTIONS

HAWAII BELT ROAD
F.A. Proj. No. BRF-019-2(18)
Scale: As Noted

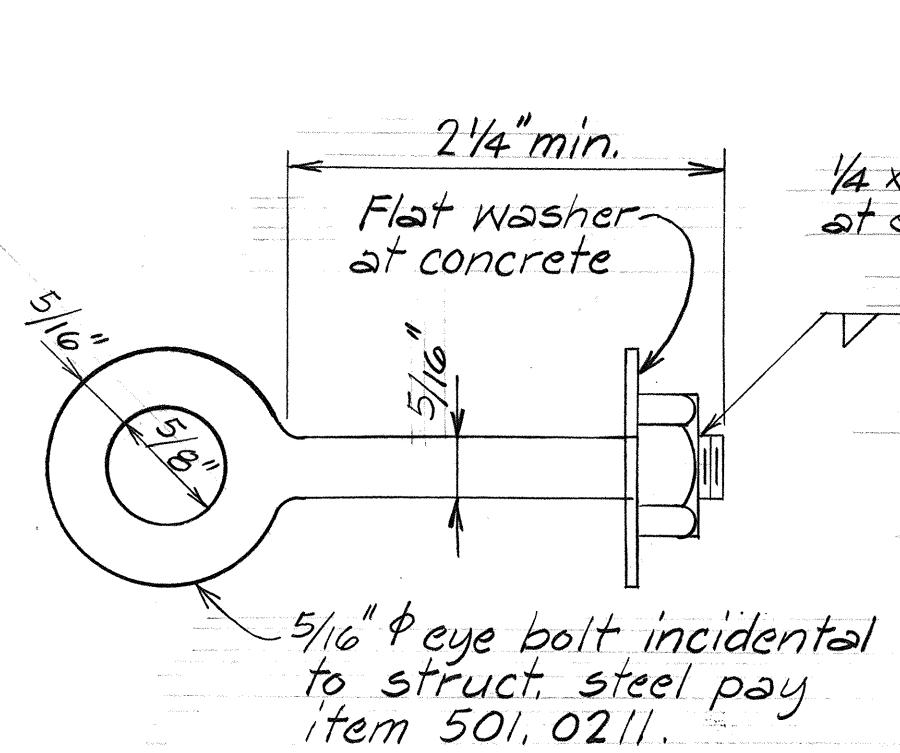
SHEET No. 8 OF 12 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY _____	DATE _____
	DRAWN BY <u>LM</u>	" "
	TRACED BY _____	" "
NOTE BOOK	DESIGNED BY <u>DLO, EN</u>	" "
	QUANTITIES BY <u>FK, TKM</u>	" "
No. _____	CHECKED BY <u>CRY</u>	" "

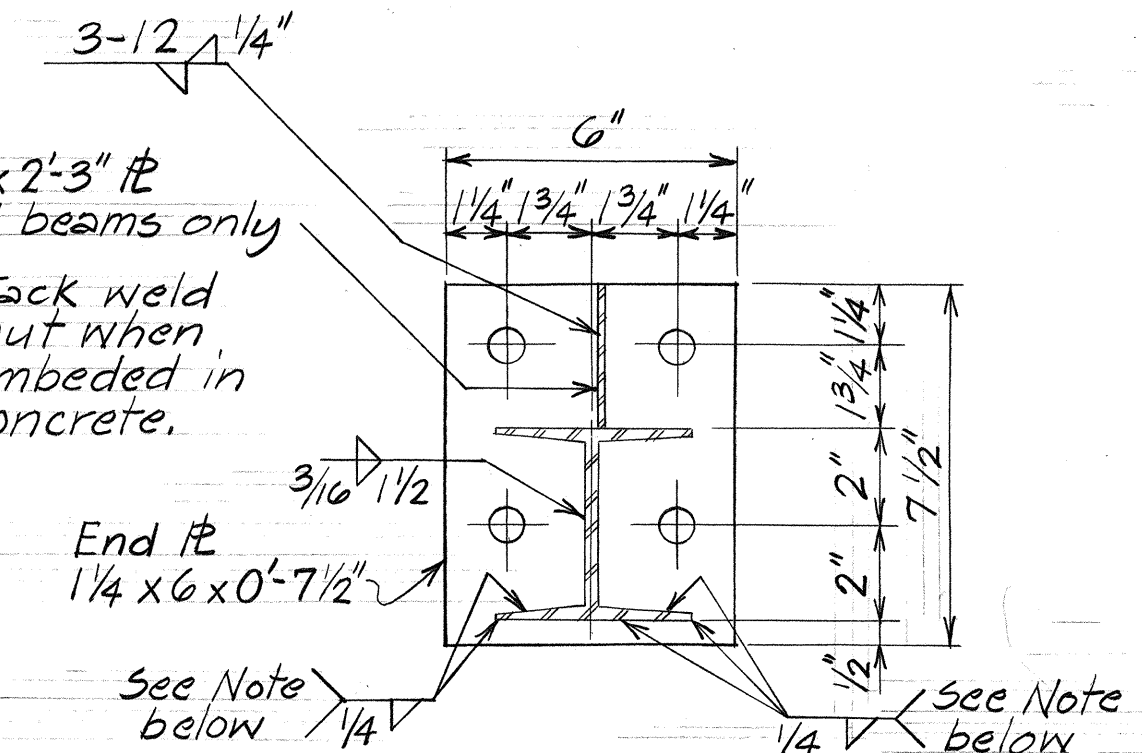
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(18)	1981	28	63



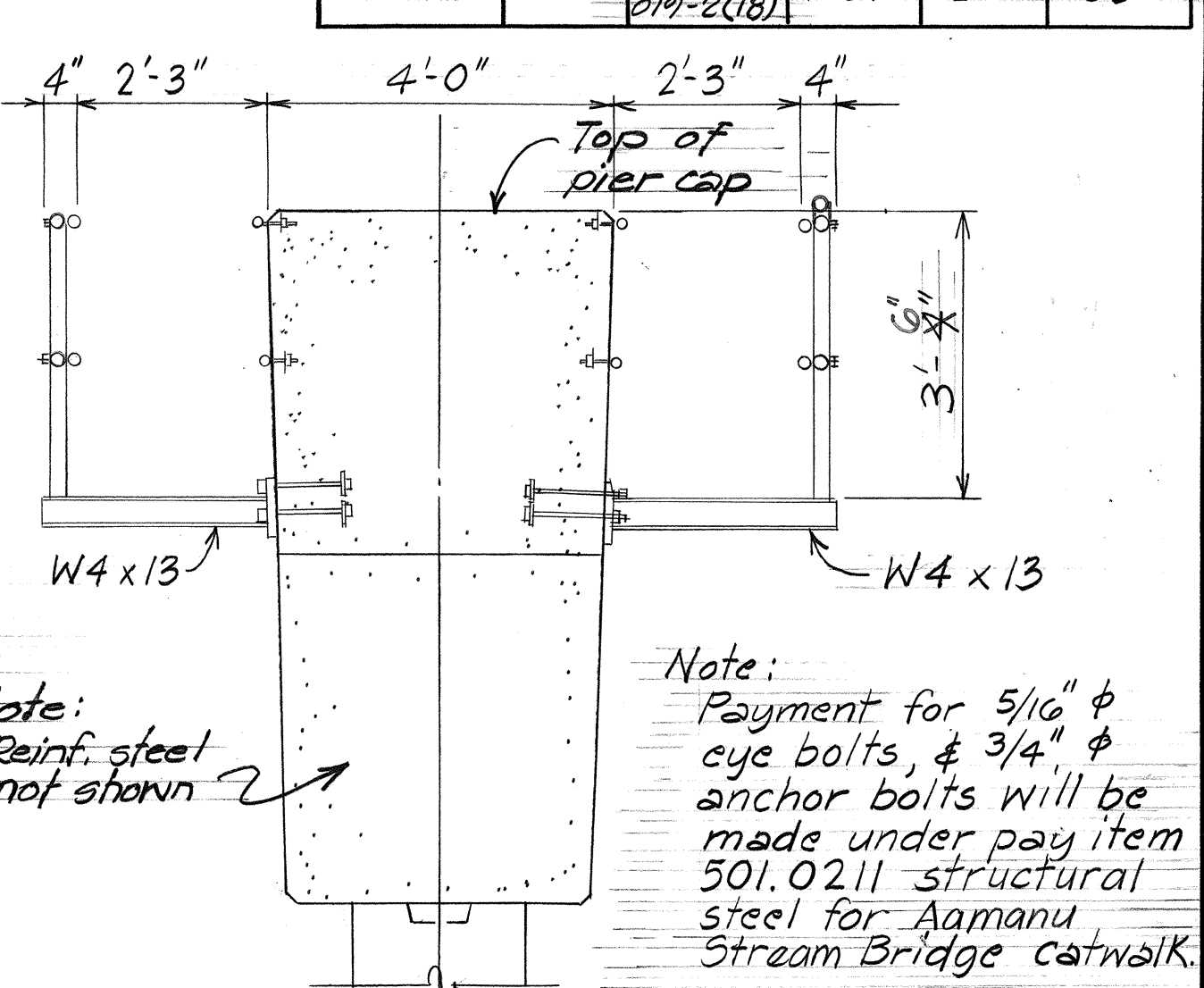
PART. PLAN - TYPICAL TOP PIER CAP
Scale: 3/8" = 1'-0"



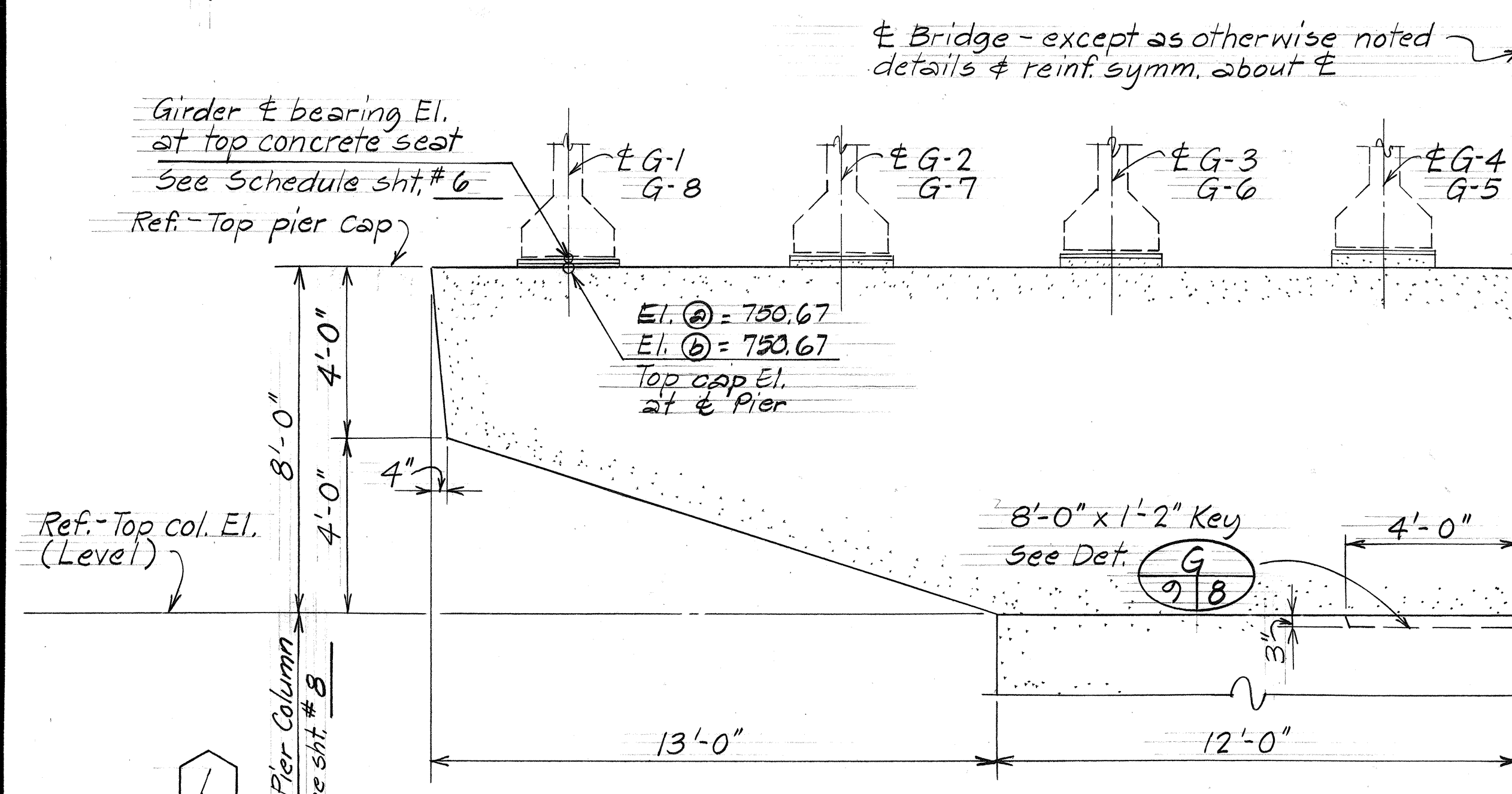
EYE BOLT DETAIL
Full Scale



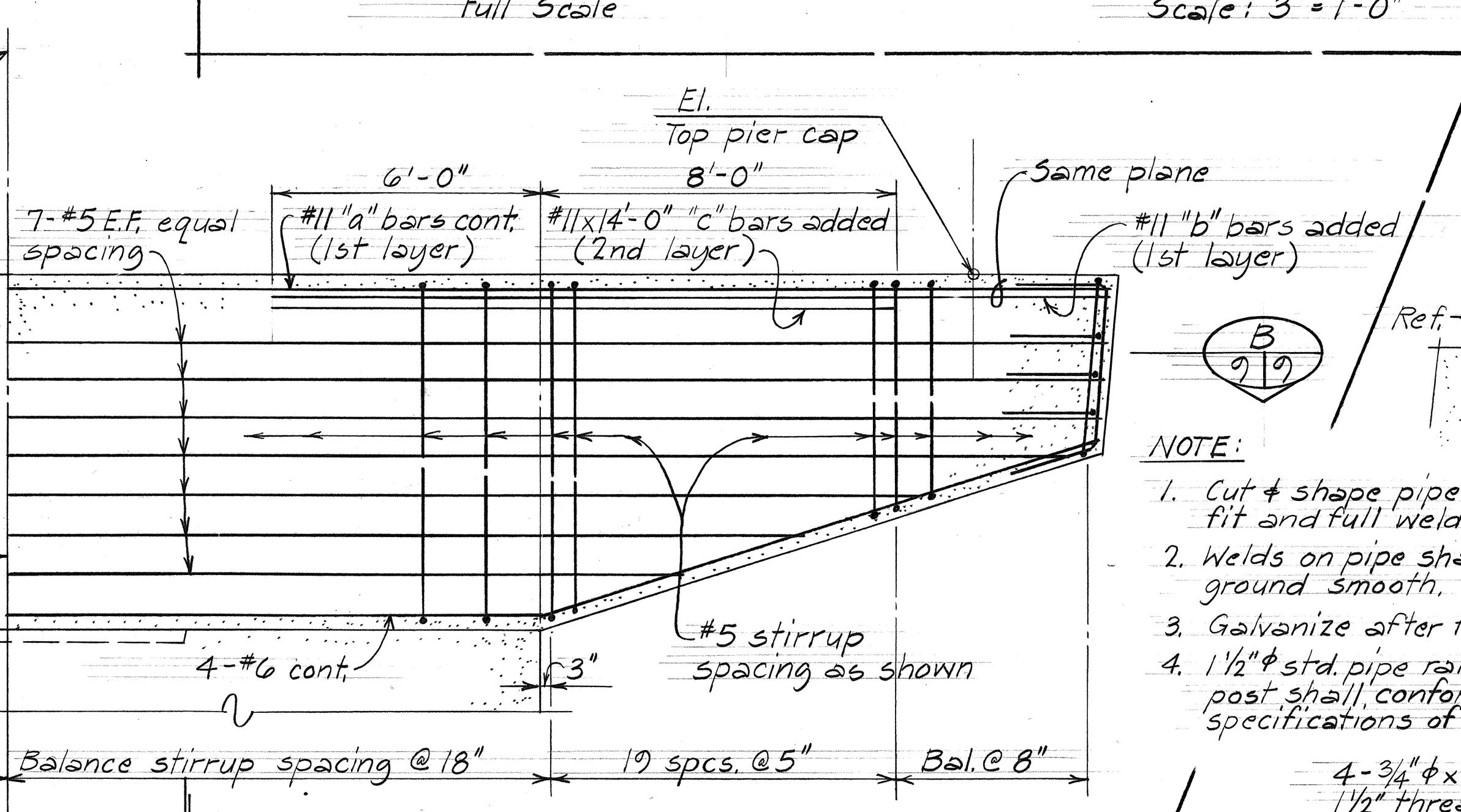
END PLATE DETAIL
Scale: 3" = 1'-0"



PIER - CATWALK DETAIL
Scale: 1 1/2" = 1'-0"

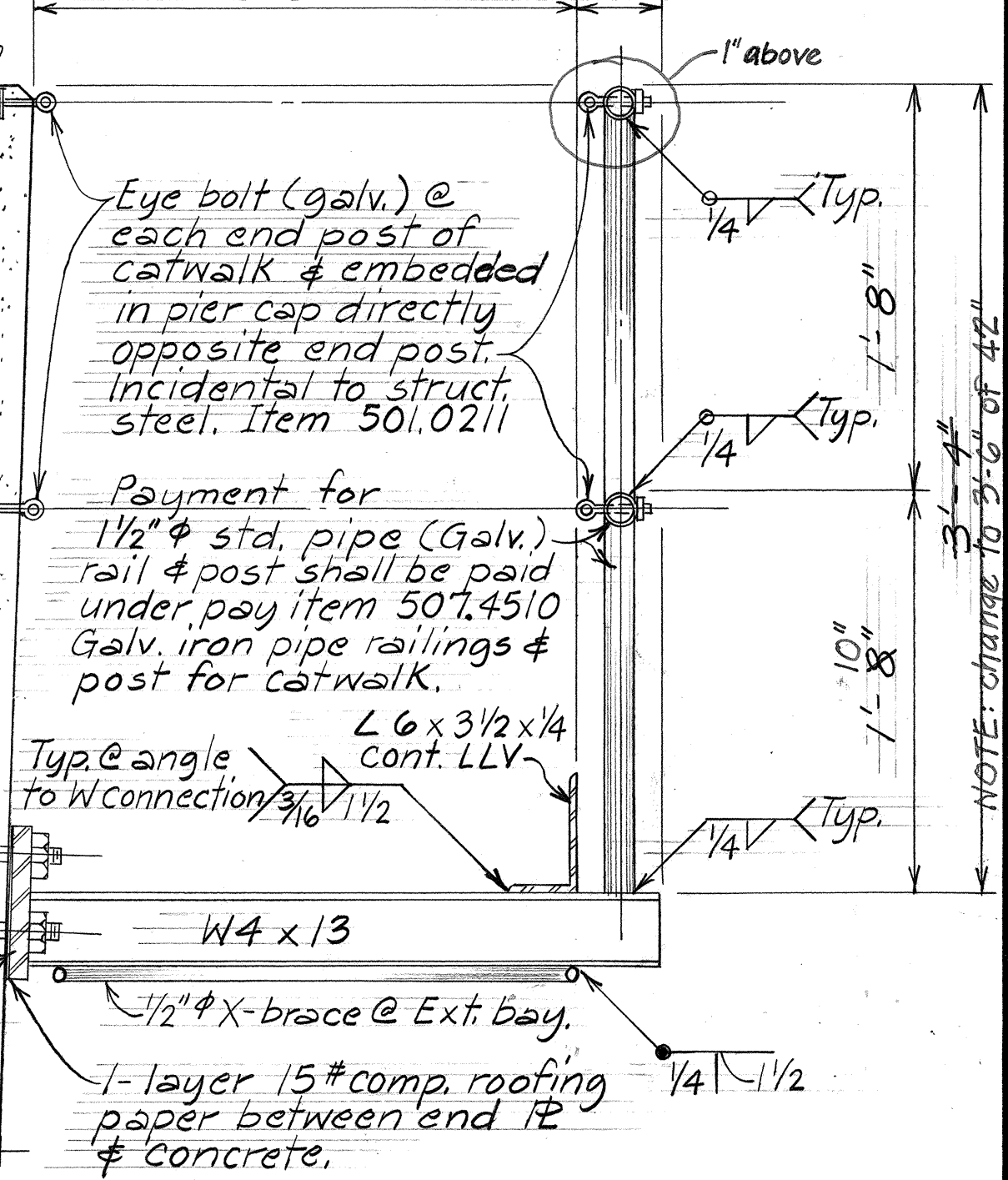


PIER DIMENSION ELEVATION - PIER CAP
Scale: 3/8" = 1'-0"

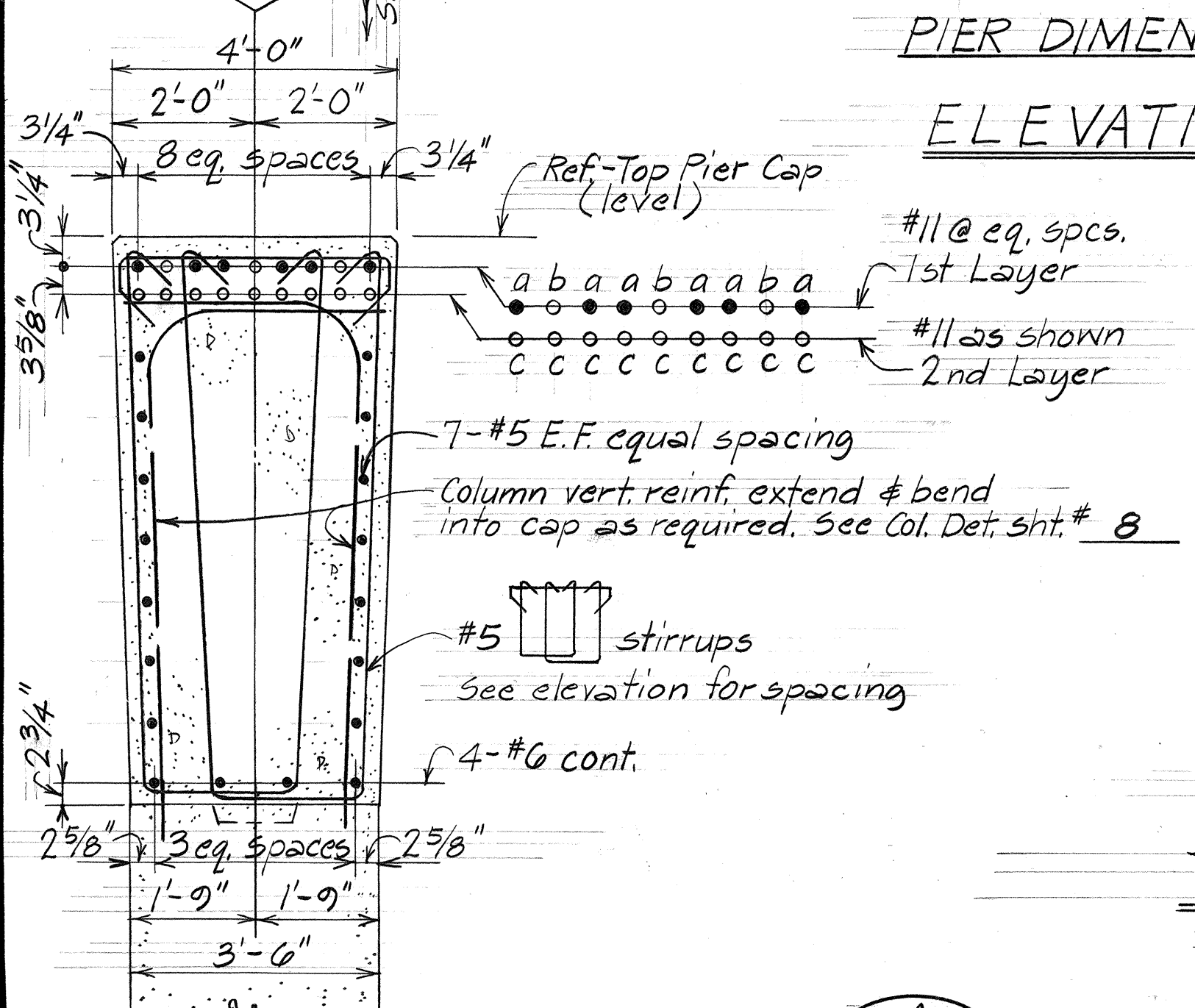


PIER REINFORCEMENT

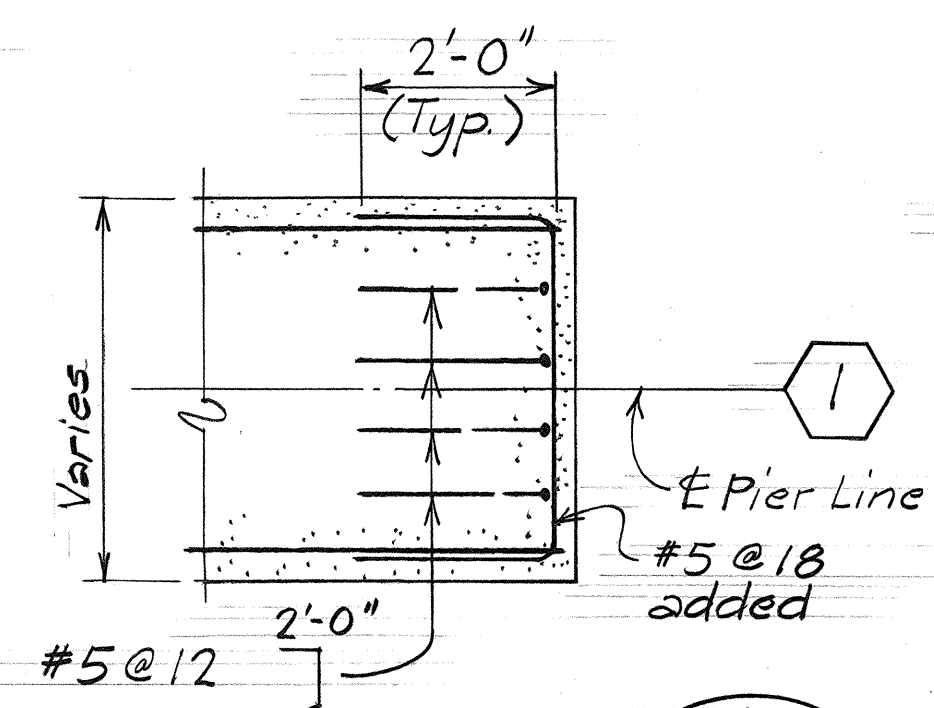
- NOTE:**
1. Cut & shape pipe for neat fit and full weld.
 2. Welds on pipe shall be ground smooth.
 3. Galvanize after fabrication.
 4. 1 1/2" std. pipe railway & post shall conform to the specifications of Section 507.



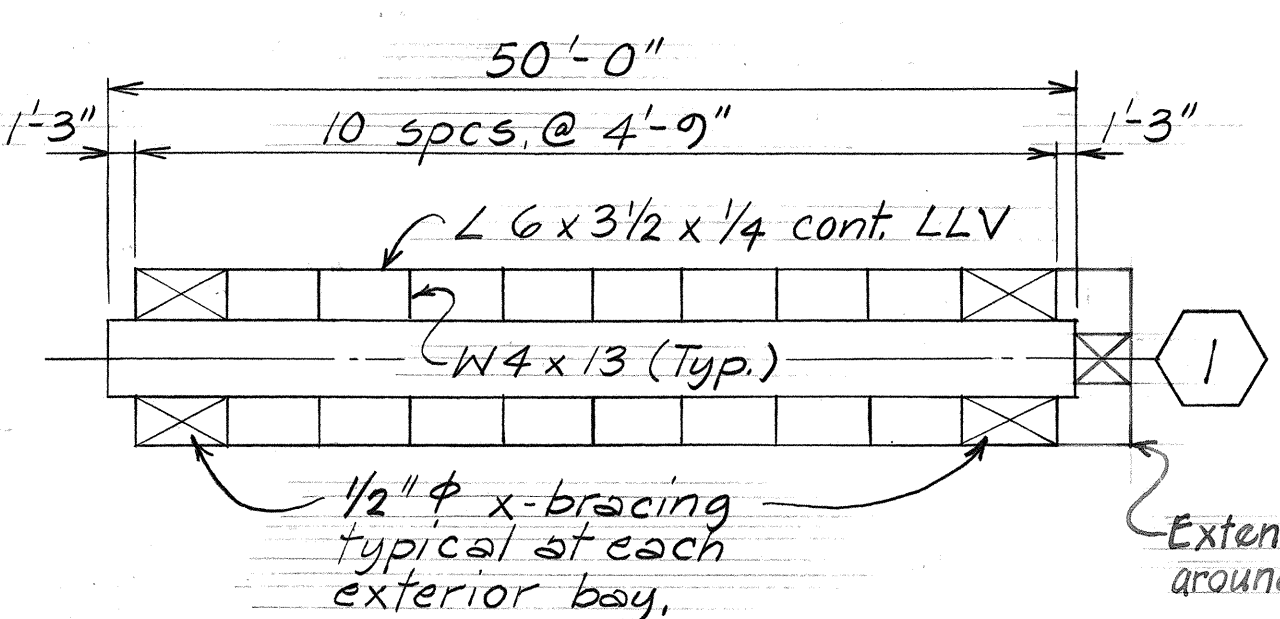
TYPICAL CATWALK SECTION
Scale: 1 1/2" = 1'-0"



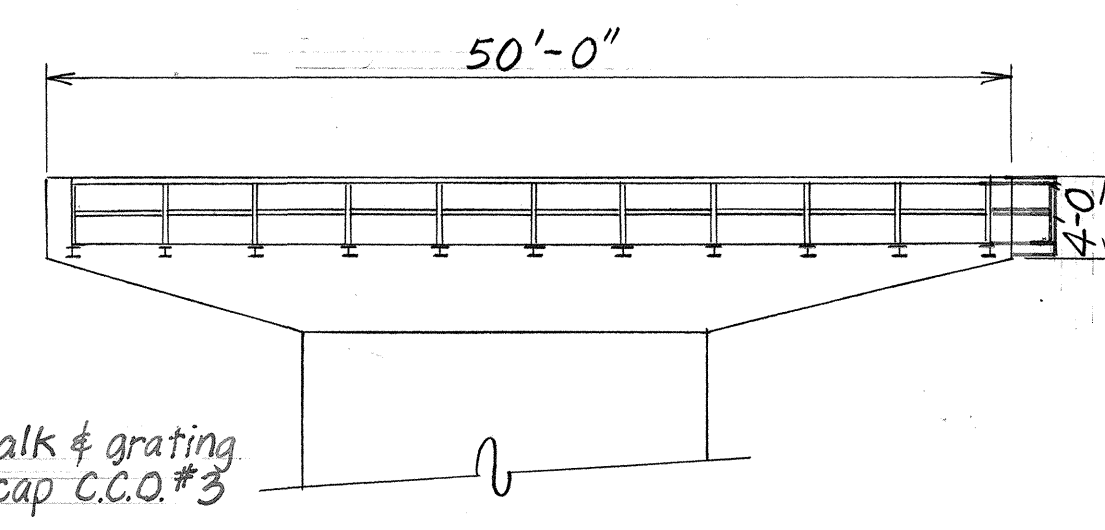
TYP. PIER CAP SECTION
Scale: 1/2" = 1'-0"



TYP. SECTION
Scale: 1/2" = 1'-0"



PLAN

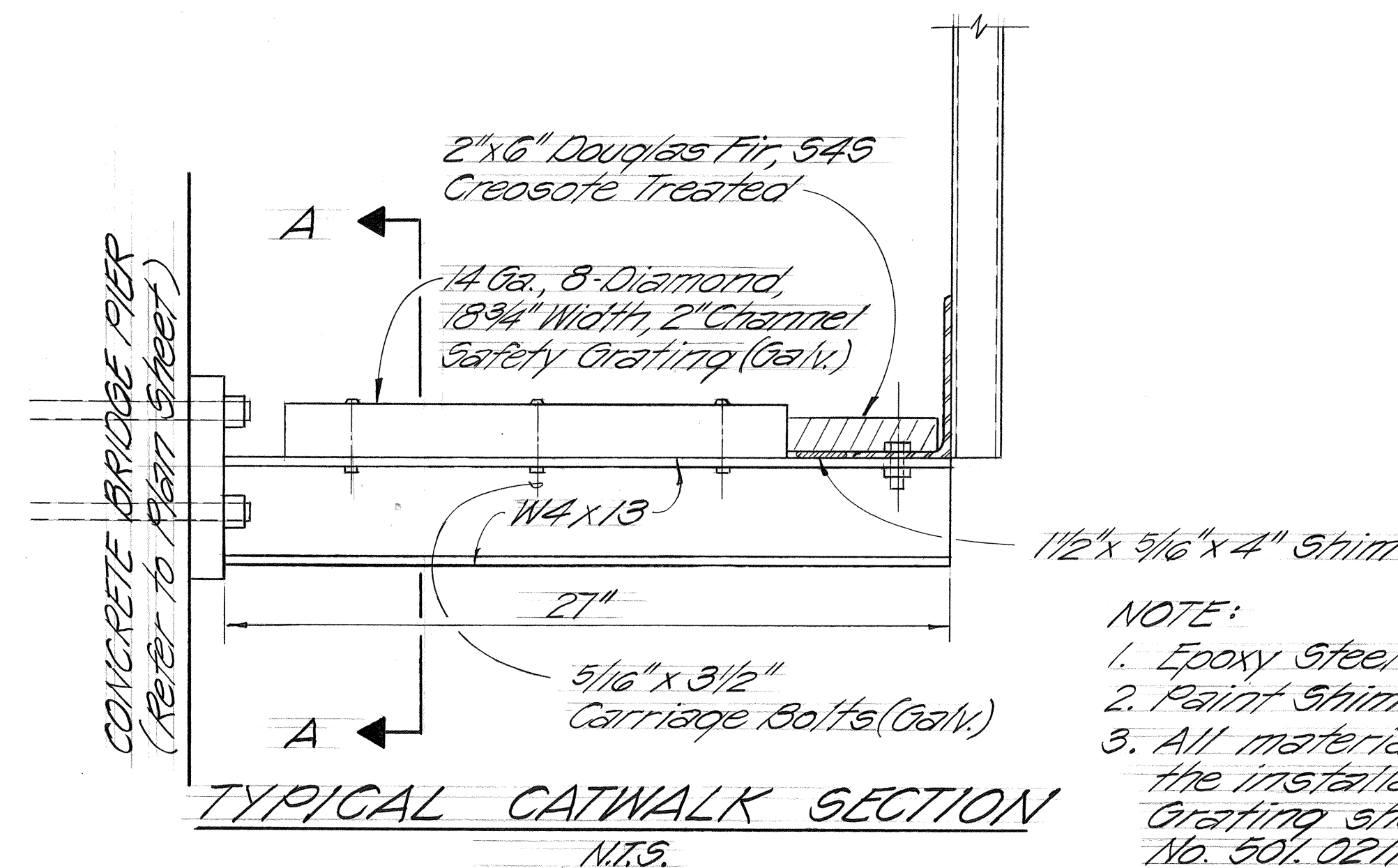


ELEVATION

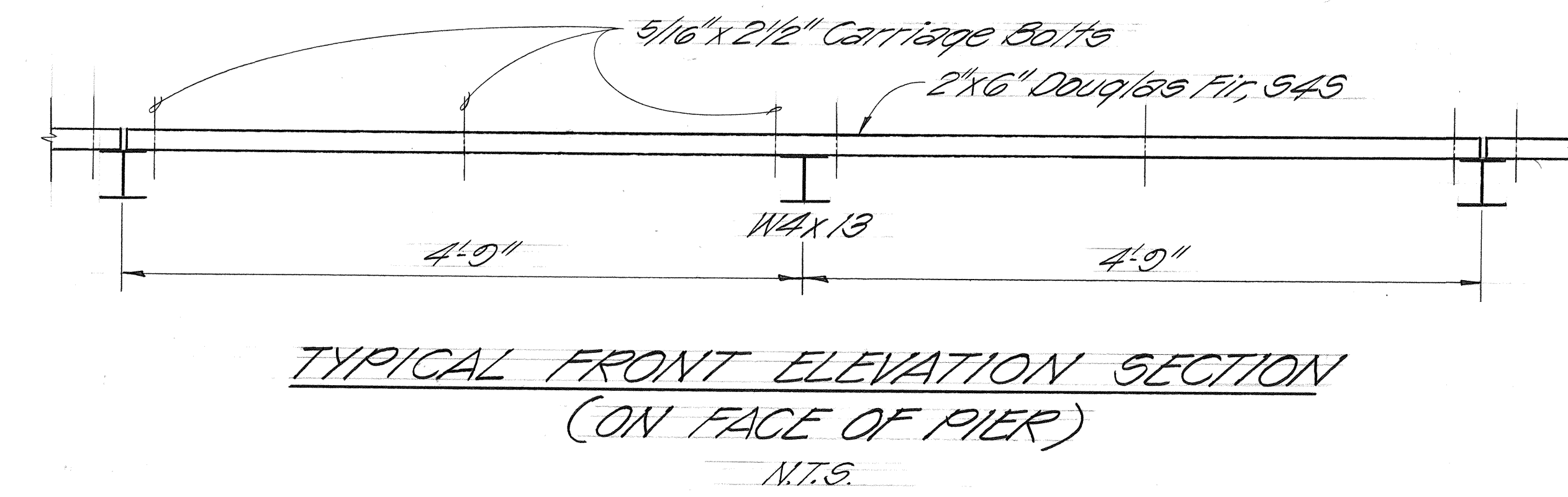
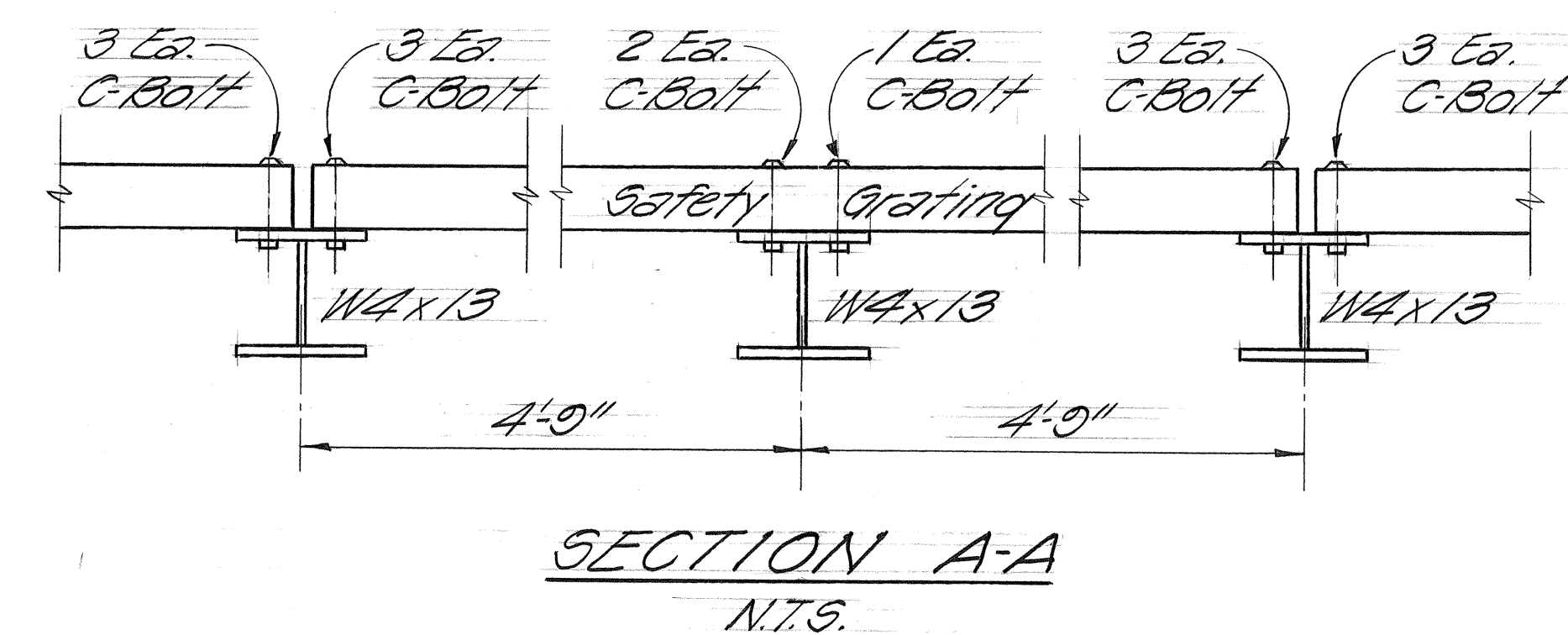
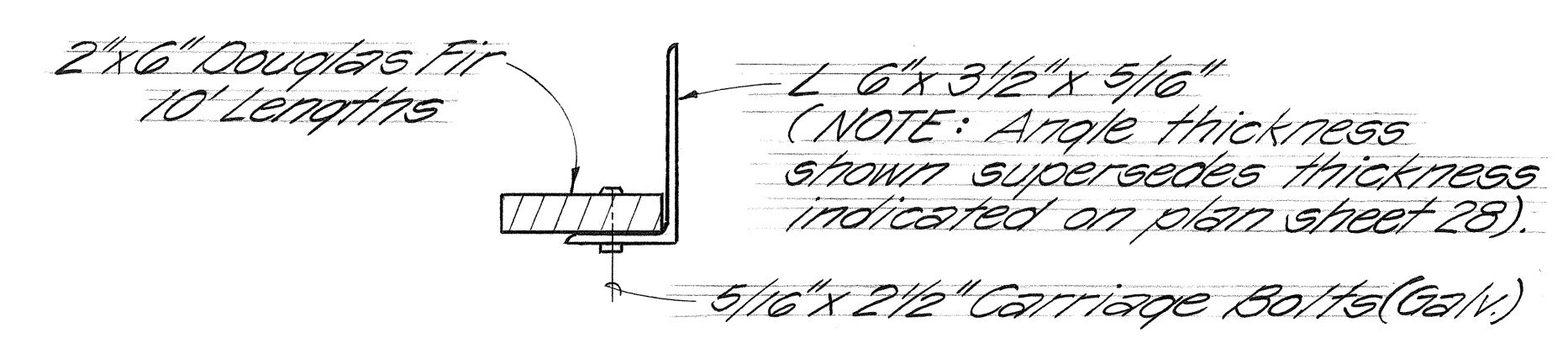
TYPICAL - CATWALK FOR PIER
Scale: 1" = 10'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
AAMANU STREAM BRIDGE
PIER 1 - CAP DETAILS & SECTIONS
CATWALK DETAILS
HAWAII BELT ROAD
F.A. Proj. No. BRF-019-2(18)
Scale: As noted
SHEET NO. 9 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(18)	1981	ADD 28 S-1	



- NOTE:
1. Epoxy Steel Shim to W4x13.
 2. Paint Shim w/ Galv. Paint after installation.
 3. All materials and labor necessary for the installation of the Catwalk Safety Grating shall be incidental to Pay Item No. 501.0211 - Structural Steel for Aamannu Stream Bridge Catwalk.



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

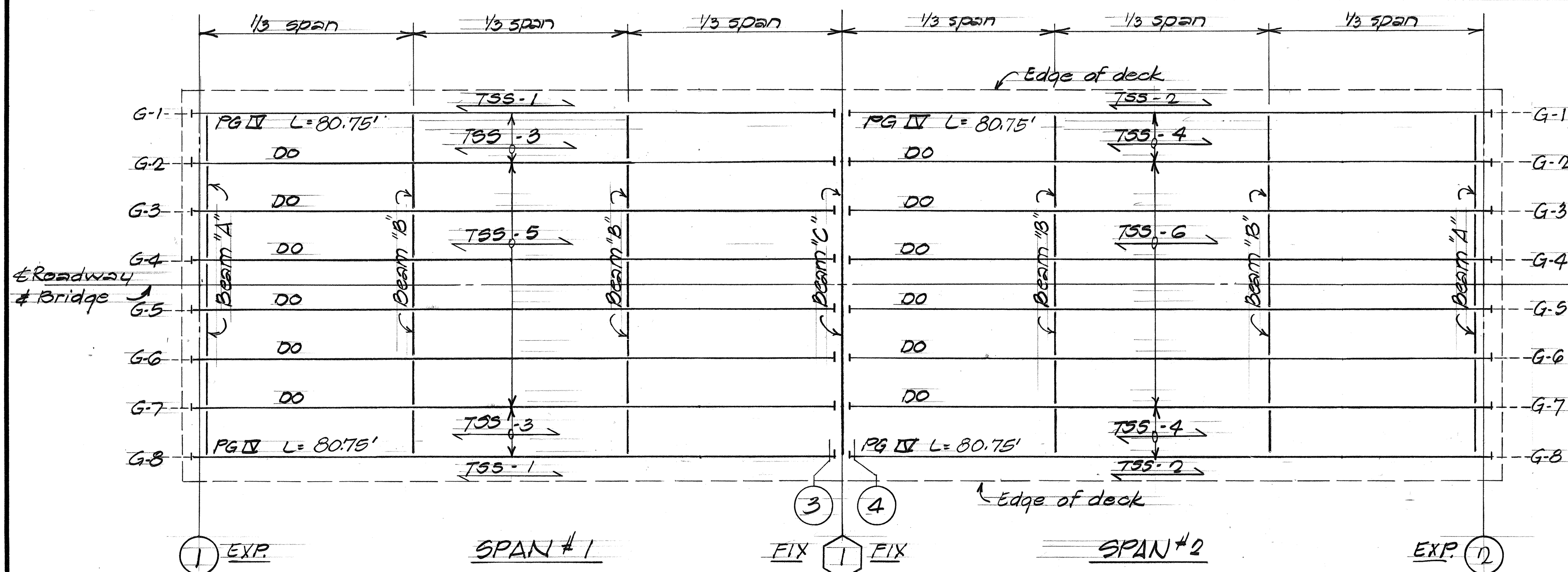
**CATWALK
SAFETY GRATING DETAILS**

HAWAII BELT ROAD
AAMANU STREAM BRIDGE REPLACEMENT
F.A.P. NO. BRF-019-2(18)

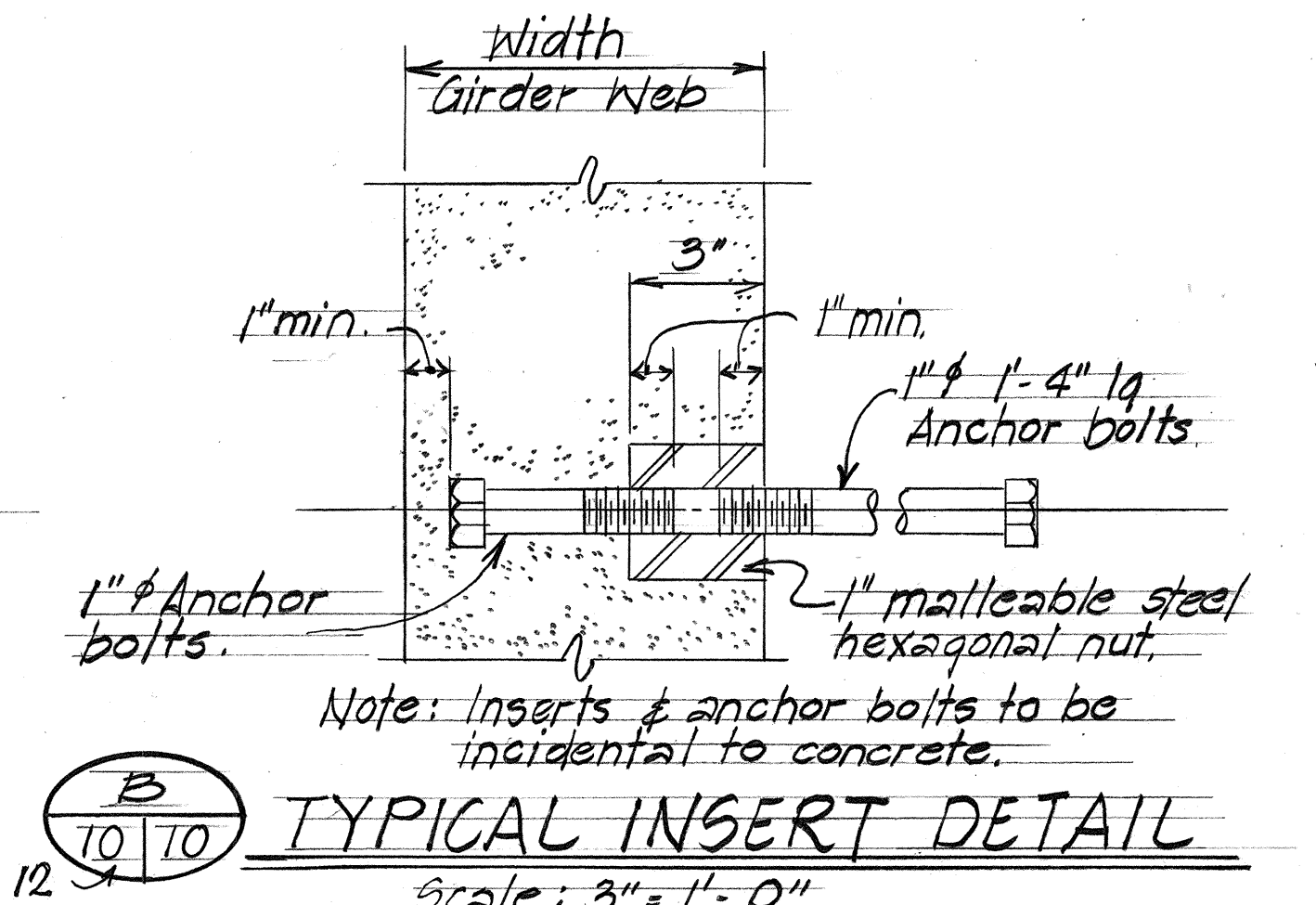
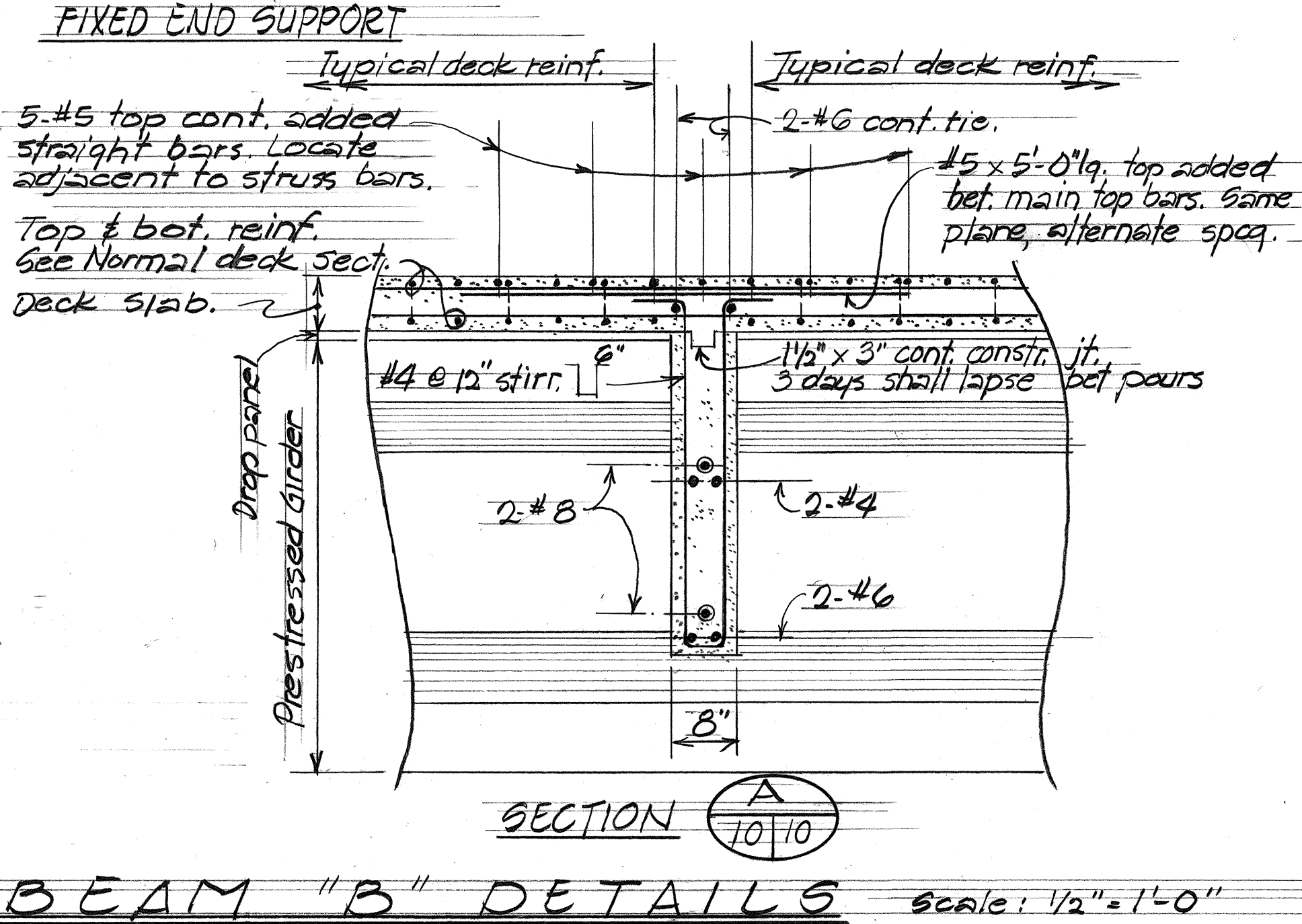
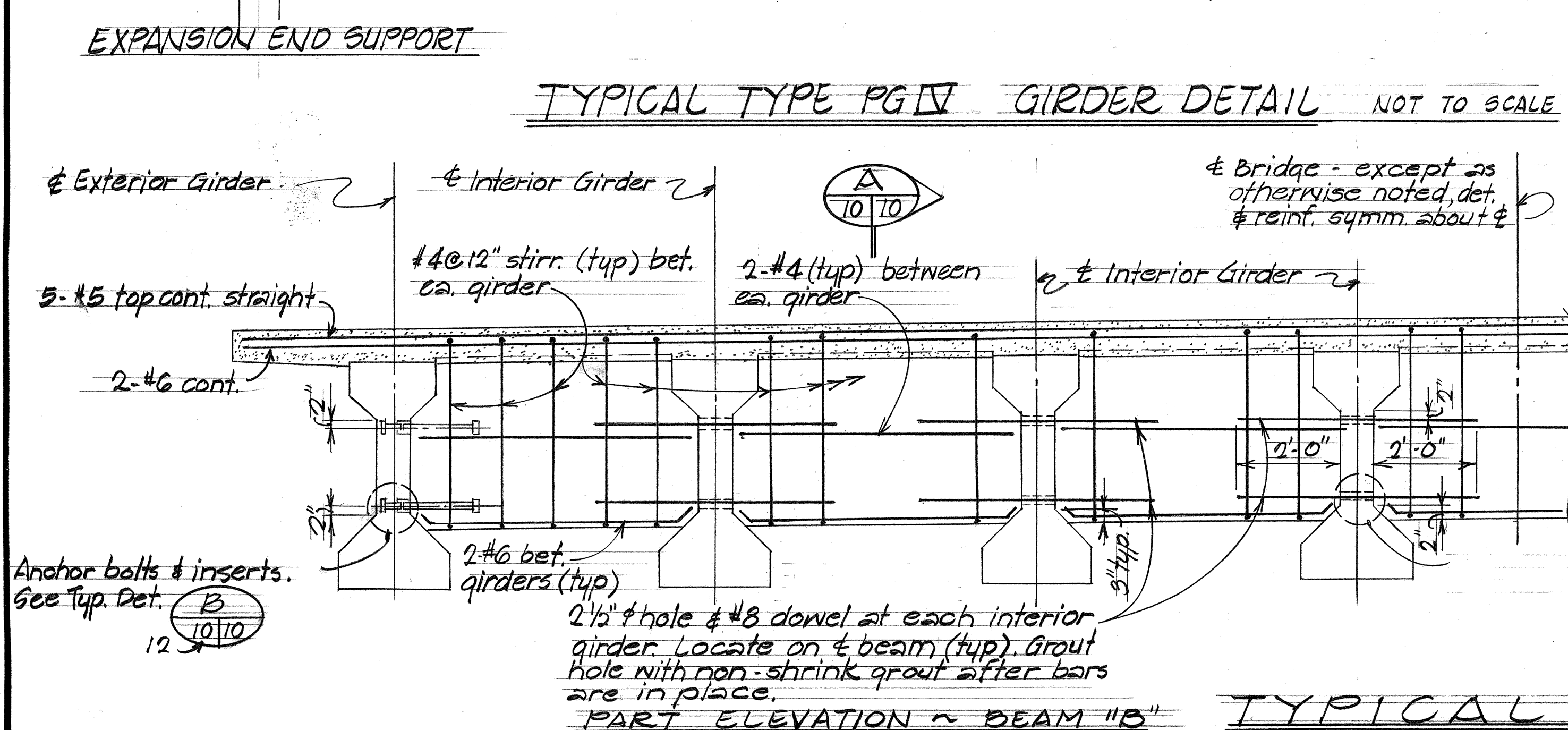
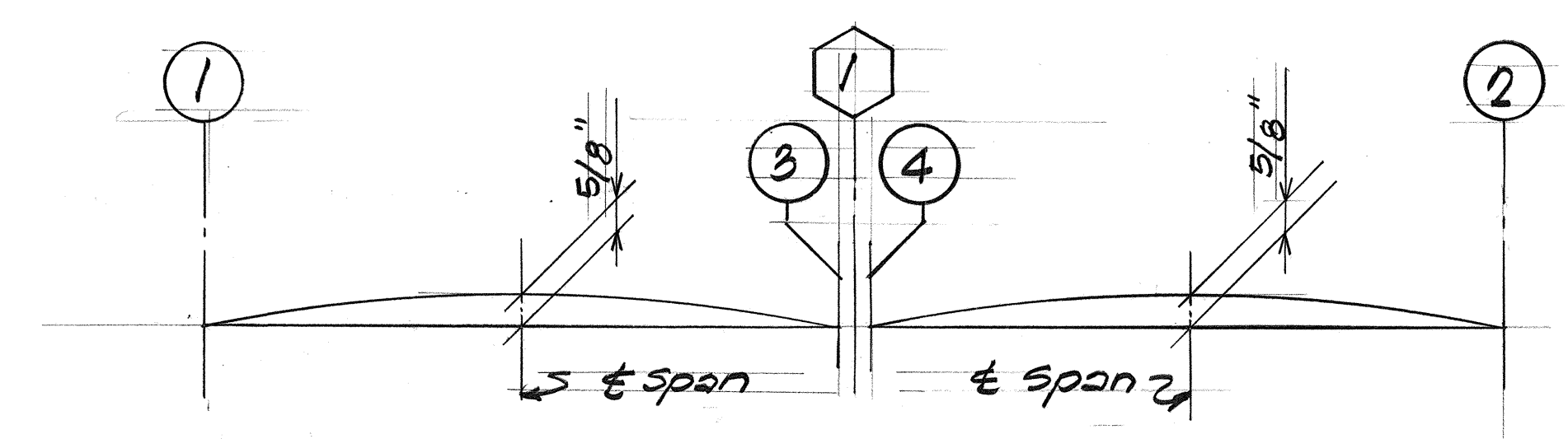
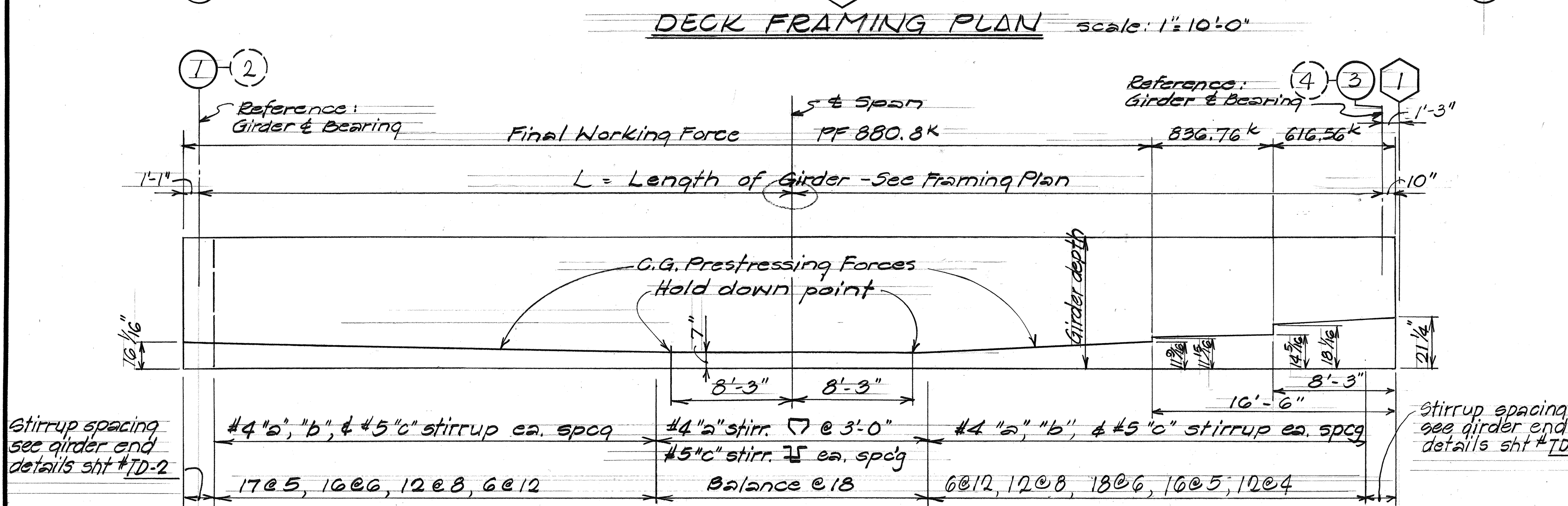
SHEET NO. OF SHEETS

SURVEY PLOTTED BY	DATE
DESIGNED BY	
TRACED BY	
NOTE BOOK	
QUANTITIES BY	
CHECKED BY	
No.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(18)	1981	29	63



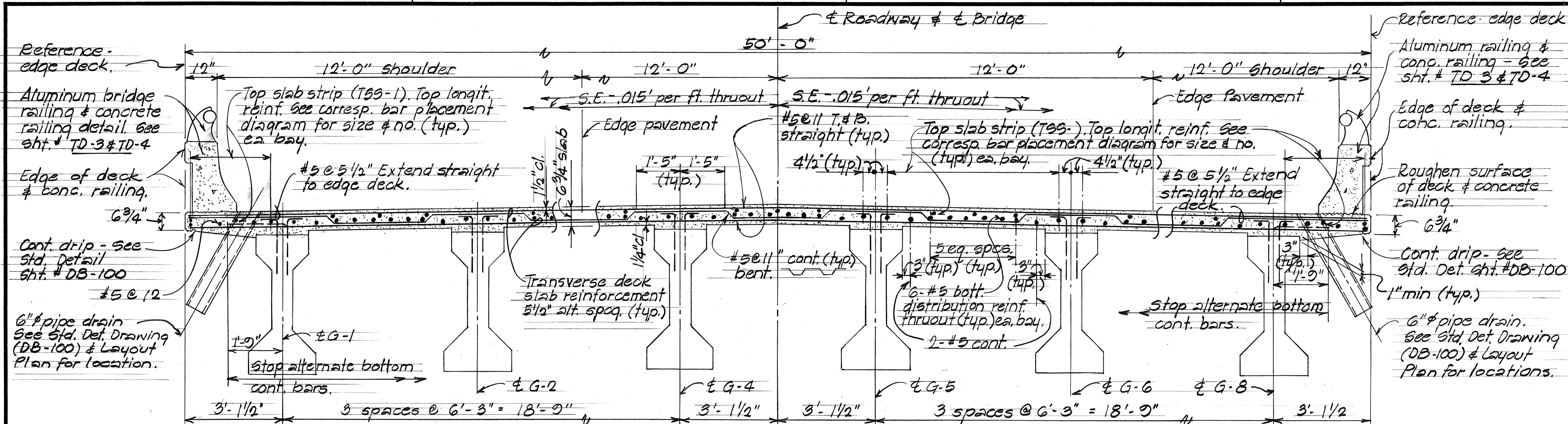
- Note:
1. Denotes extent of Top Slab Strip (TSS) between girders each bay. Refer to Typical Deck Slab Sections & Corresponding Bar Placement Diagram for size & nos. sht # 11
 2. For additional Notes see sht # 11
 3. Locate Bm "B" at 1/3 span as indicated on plan.
 4. Girder dimension L = horizontal measurement between girder & bearing each end of girder. The Contractor shall determine total length of girder.



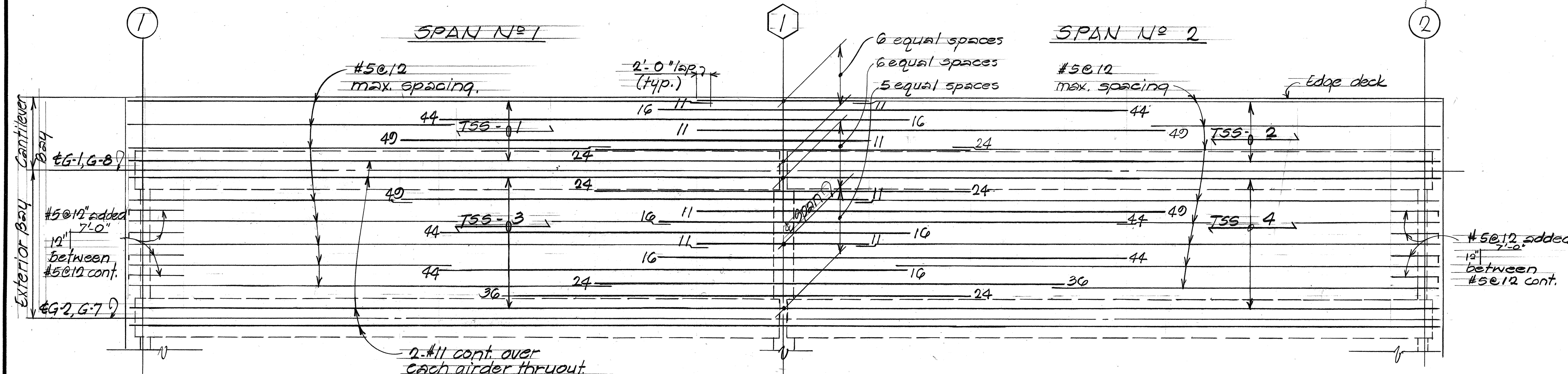
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
AAMANU STREAM BRIDGE
DECK FRAMING PLAN,
PRESTRESSED GIRDER DETAIL,
AND BEAM "B" DETAIL
HAWAII BELT ROAD
FA Proj. No. BRF-019-2(18)
Scale: As noted
SHEET NO. 10 OF 12 SHEETS

DATE: 10/10/81
DESIGNED BY: DCO, SA, NY
CHECKED BY: CRY
ORIGINAL PLAN
NOTE BOOK
NO.

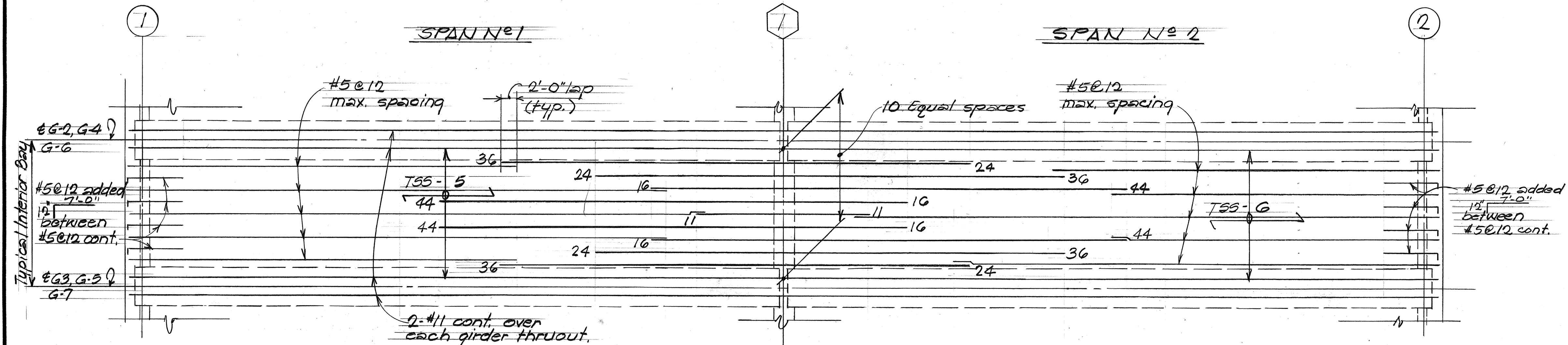
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(18)	1981	30	63



TYPICAL NORMAL DECK SECTION Scale: 1/2" = 1'-0"



- NOTES:
- 1 - All reinforcement #11 except as otherwise noted.
 - 2 - Number at end of bars denotes dimension in feet from the adjacent pier line numeral.
 - 3 - For additional slab reinforcement see Normal Section & corresponding details.
 - 4 - All #5@12 bars shall be extended & lapped 2'-0" min. with the adjacent #11 bars as shown.
 - 5 - Bars in TSS-1 & TSS-2 shall be placed so no bar will interfere with 6" pipe drains.



TYPICAL ARRANGEMENT OF REINFORCEMENT ~ TOP SLAB STRIPS TSS-1 THRU TSS-6 INCLUSIVE

Scale: Transverse 3/8" = 1'-0"
Horizontal 1/8" = 1'-0"

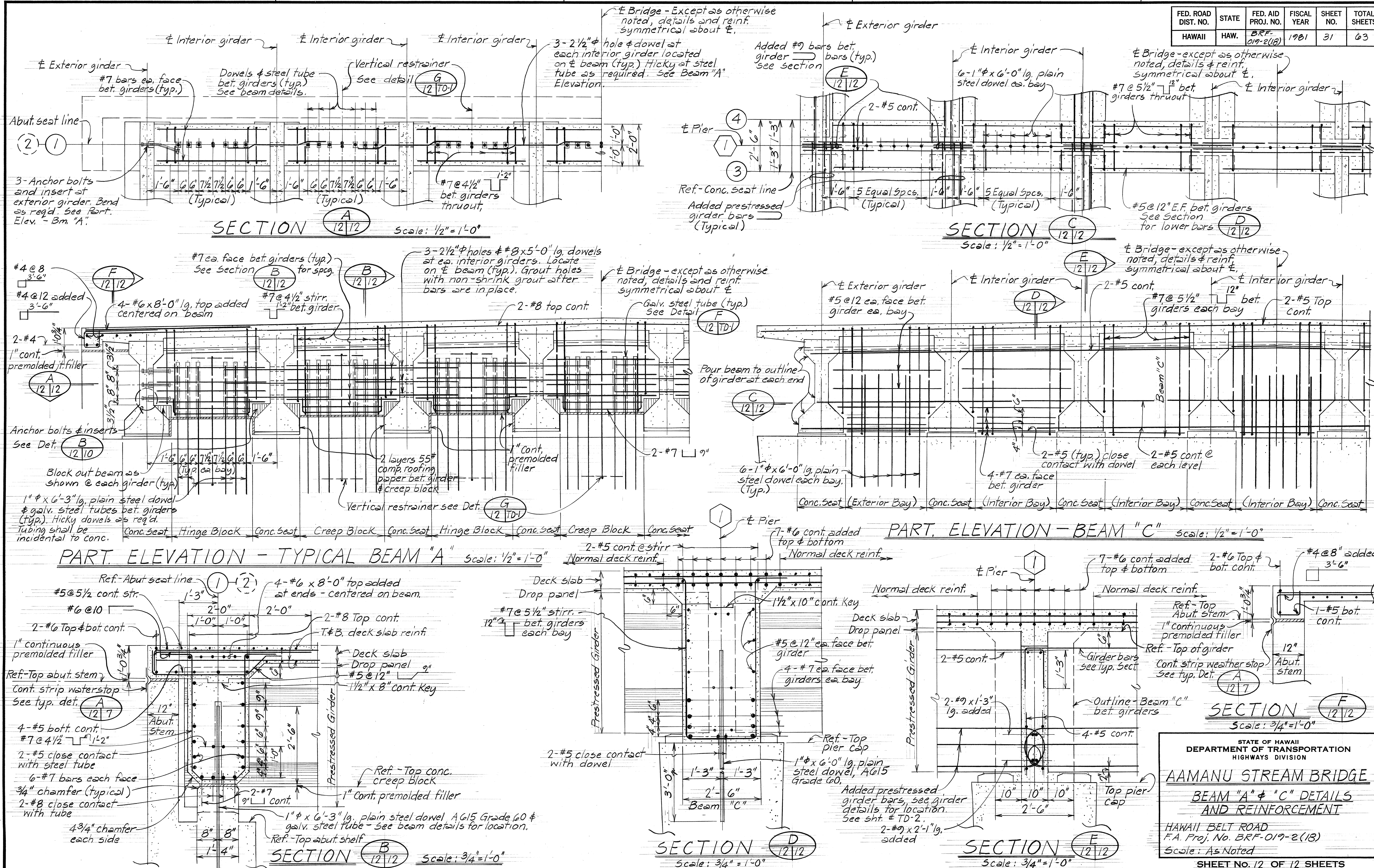
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

AAMANU STREAM BRIDGE
TYPICAL BAR PLACEMENT
DIAGRAM TSS-1 THRU TSS-6
AND TYPICAL NORMAL DECK SECTION

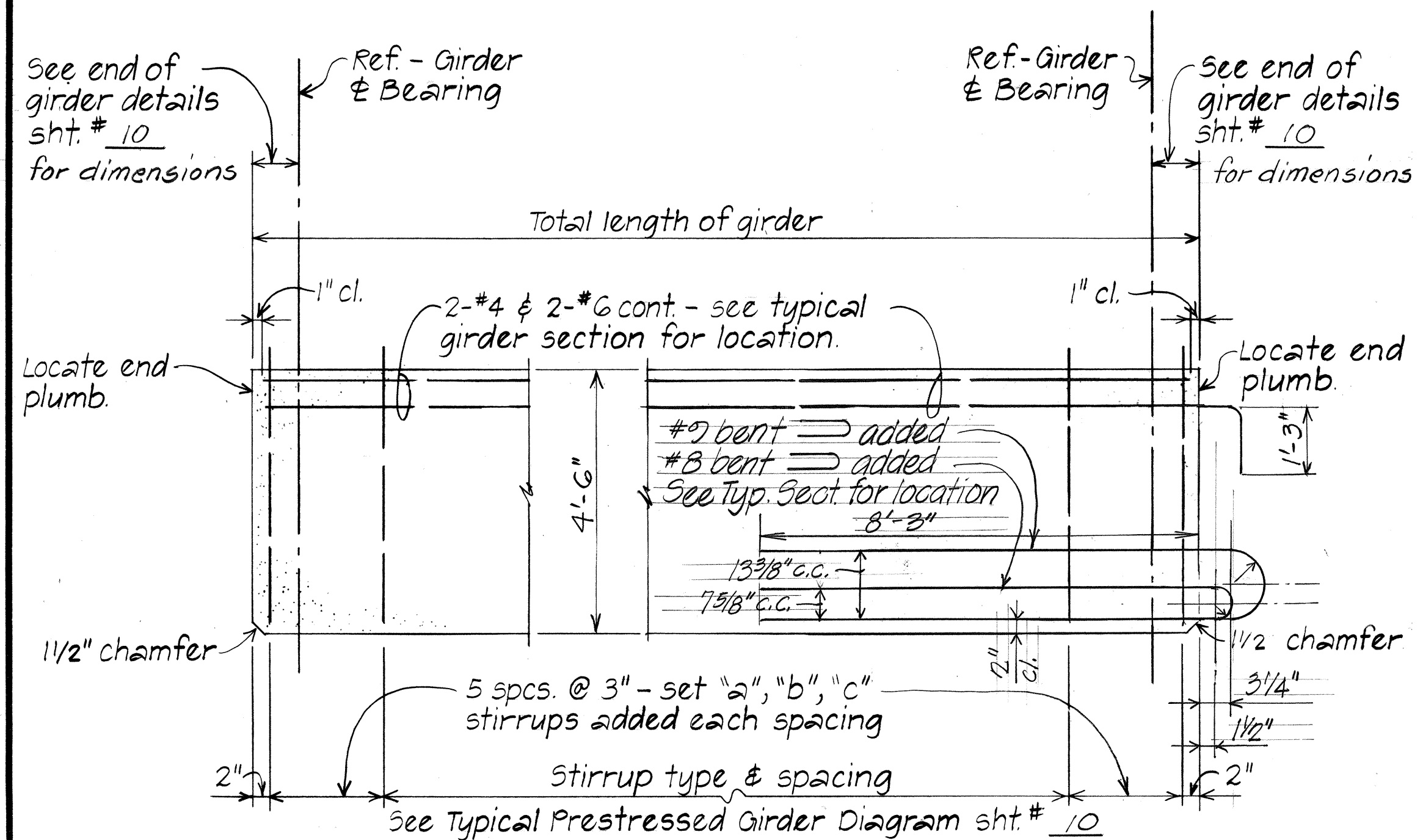
HAWAII BELT ROAD
F.A. Proj. No. BRF-019-2(18)
Scale As Noted

SHEET No. 11 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF- 019-2(12)	1981	31	63



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(18)	1981	33	63



ELEVATION ~ TYPE PG-IV GIRDER END DETAILS
No Scale

BUNDLING OF PRESTRESSING REINFORCEMENT

ARRANGEMENT AND CLEARANCE FOR PRETENSIONED STRANDS

1. Strands may be bundled in groups as shown.
2. The minimum distance "S" between groups or individual strands 2" for 1/2" strands.
3. "S" is measured between centers of adjacent strands.

CASE I

CASE II

Small space permitted within group

#4 @ 18 between & 6'-0" ea. side of harp pts. at top of each bundle.

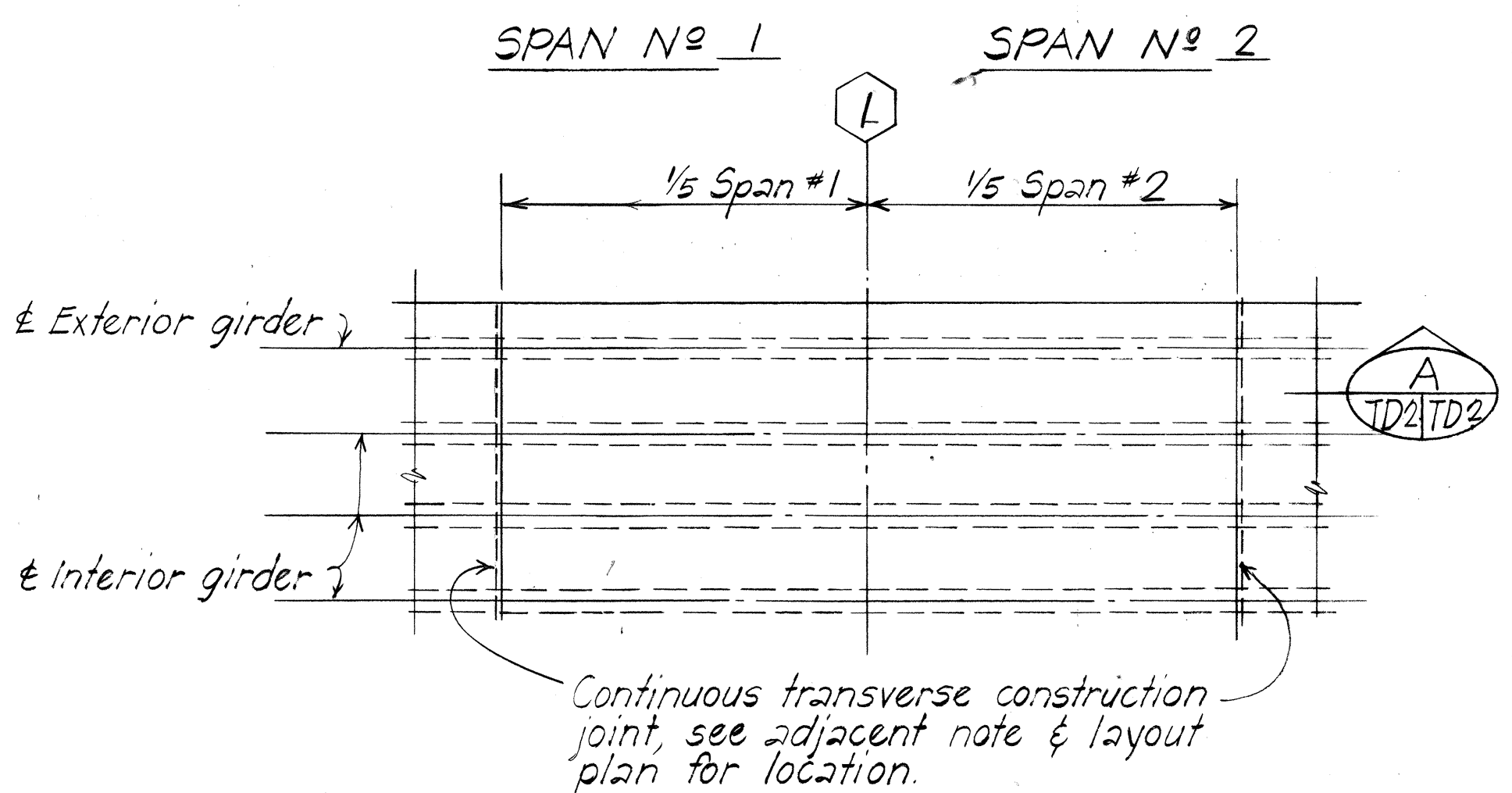
Max. of 6 vertically stacked strands in any one group.

ARRANGEMENT AND CLEARANCE FOR POST-TENSIONED STRANDS

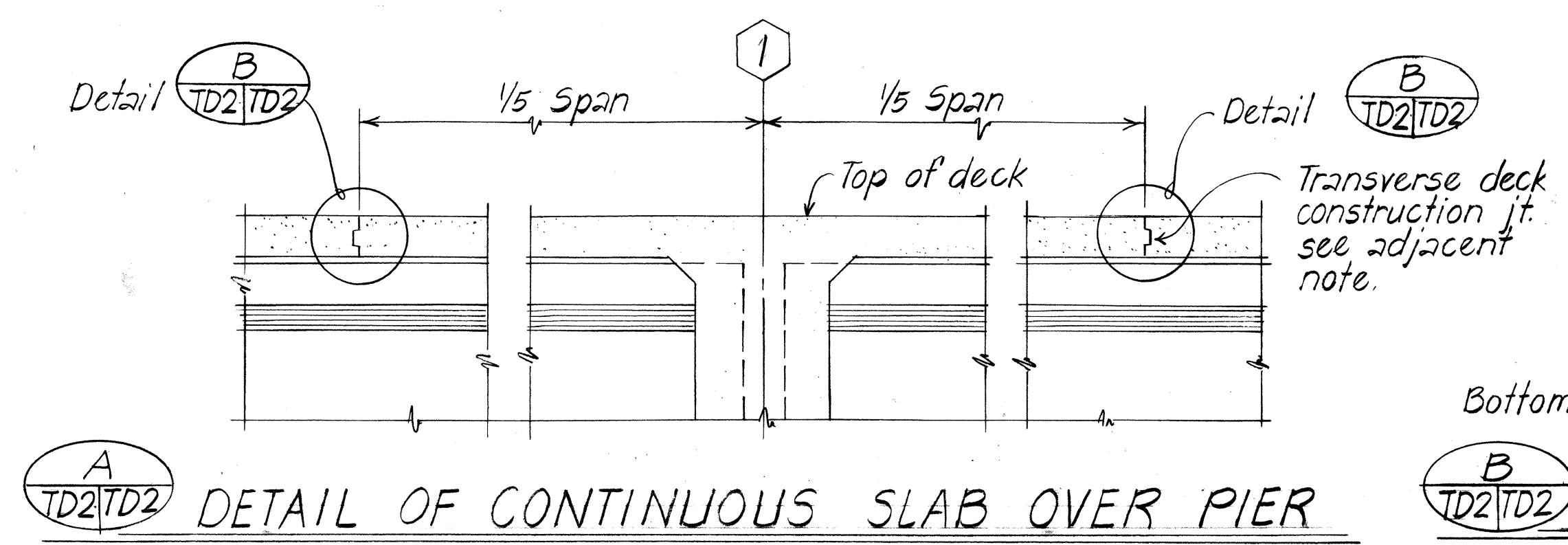
1. Horizontal clearance between units equals 2" minimum.
2. Units may be bundled vertically in groups of 3" minimum.
3. Vertical clearance between bundled units equal 3" minimum.
4. Approval of the Engineer is required for deviation.

LEGEND:
 (#2 & #8 bars)
 ● = Span 1 girders
 ○ = Span 2 girders

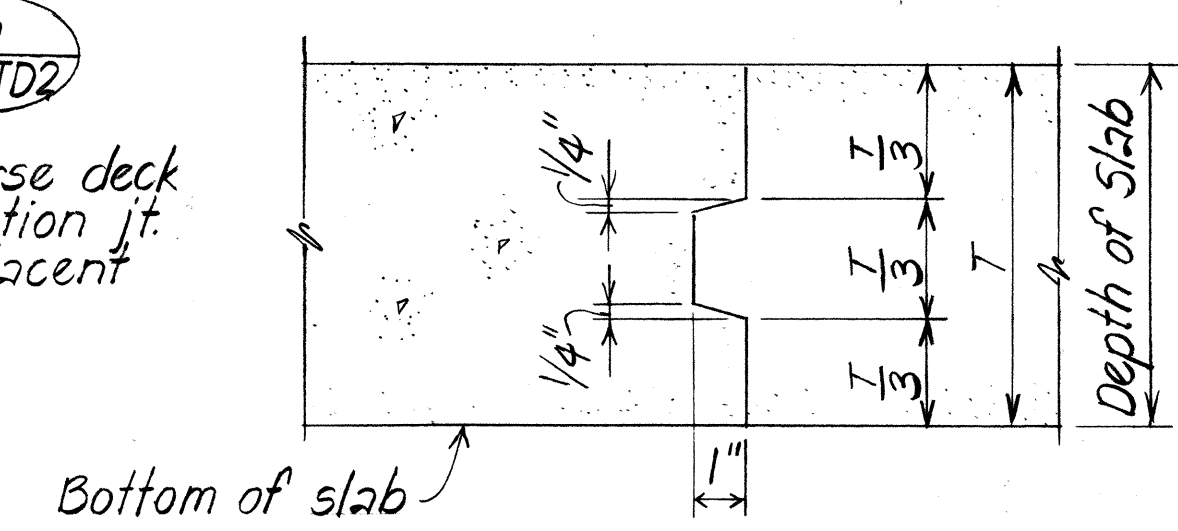
NOTE:
 Transverse deck construction joint shall be used at these locations. The portion of the pour indicated between construction joints over the pier shall not be poured until the pours for the adjacent positive moment areas have been completed.
 Transverse deck construction joints may be eliminated if permitted by the Engineer in writing. If the construction joints are eliminated, water reducing and retarding admixture conforming to AASHTO Designation: M194, Type D, shall be added to the deck concrete over the pier within the indicated lines. The type of the admixture shall be such that the amount of dosage used will produce the retardation required. The type and dosage of the admixture, and the method of pour shall be approved by the Engineer.



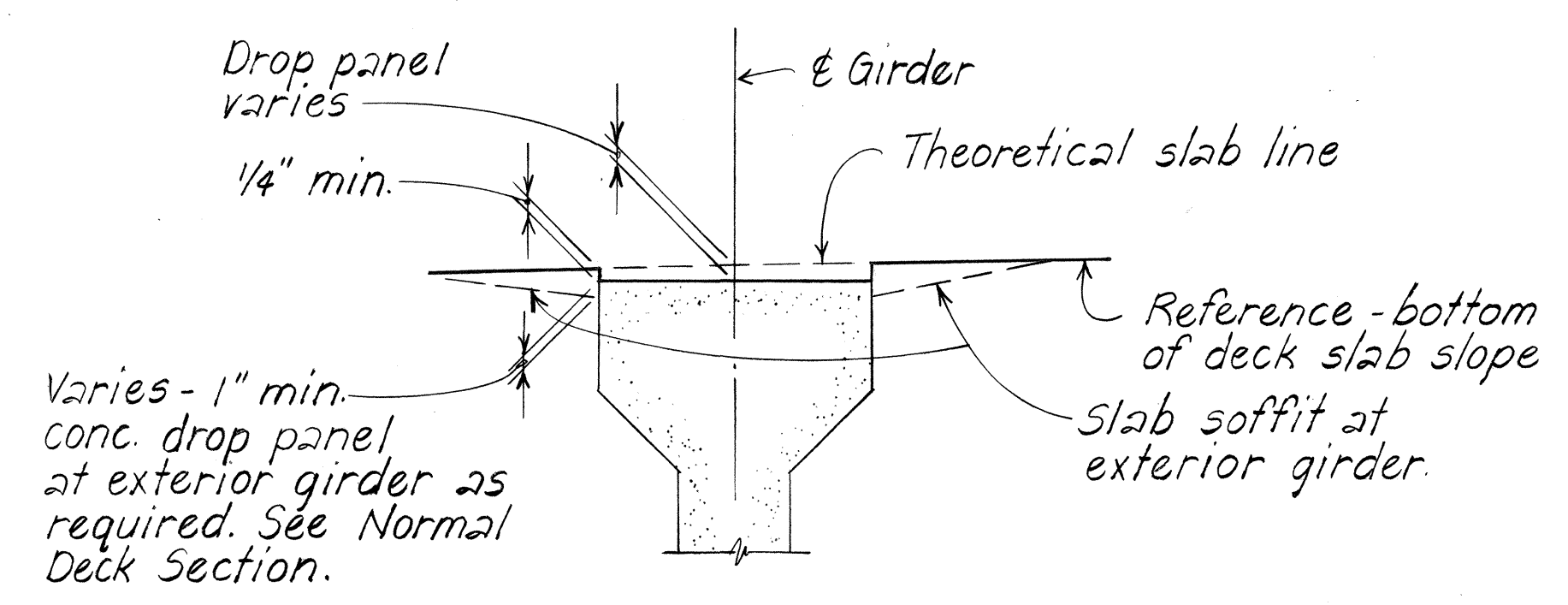
PLAN-TYPICAL TRANSVERSE DECK CONSTRUCTION JOINT LOCATION



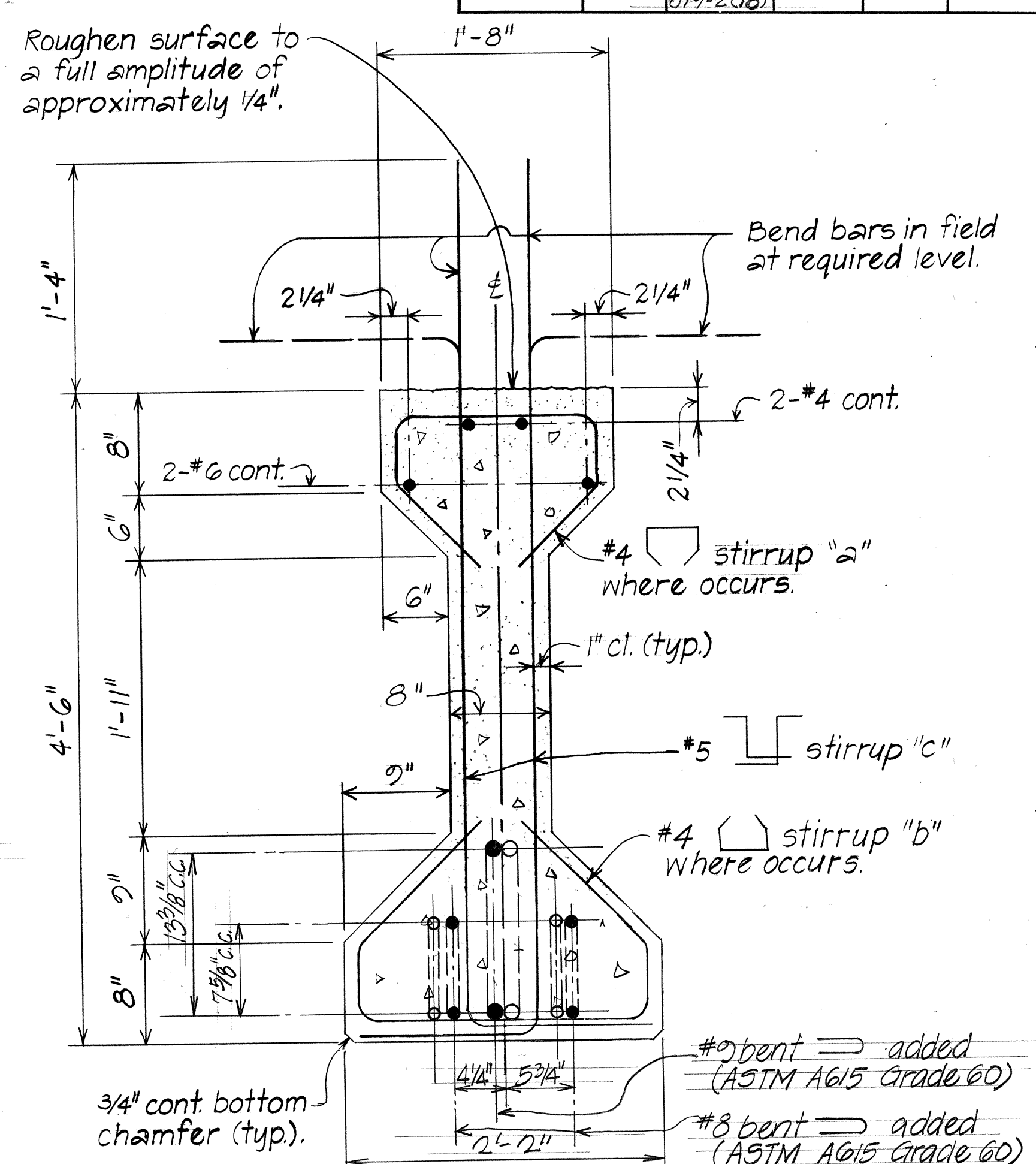
DETAIL OF CONTINUOUS SLAB OVER PIER



TYPICAL SLAB CONSTRUCTION JOINT DETAIL



TYPICAL SLAB DROP PANEL DETAIL AT PRESTRESSED GIRDER
Not to Scale



TYPICAL PRESTRESSED CONCRETE GIRDER TYPE PG-IV
No Scale

GENERAL NOTES

1. For design stresses refer to sht. #2 and corresponding girder detail drawings.
2. Forms must be removed and the beams inspected before strands are cut.
3. For additional holes and inserts in prestressed girders for beam connections refer to corresponding beam details.
4. For additional prestressed girder details not covered by these drawings refer to corresponding detail plans.
5. All strand patterns shall be approved by the Engineer.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

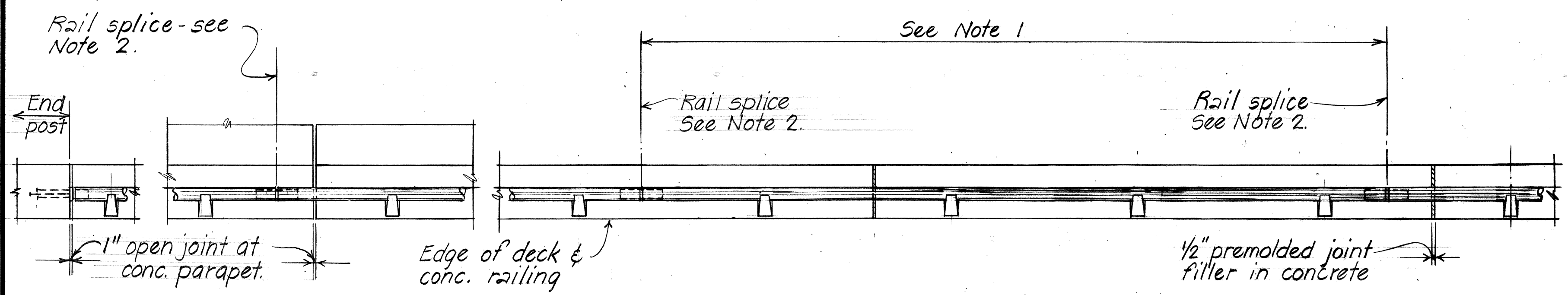
AAMANU STREAM BRIDGE

TYPICAL PRESTRESSED GIRDER TYPE PG-IV DETAILS

HAWAII BELT RD.
F.A. Proj. No. BRF-019-2(18)
Scale: As noted Date:

SHEET No. TD2 OF TD5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(18)	1981	34	63



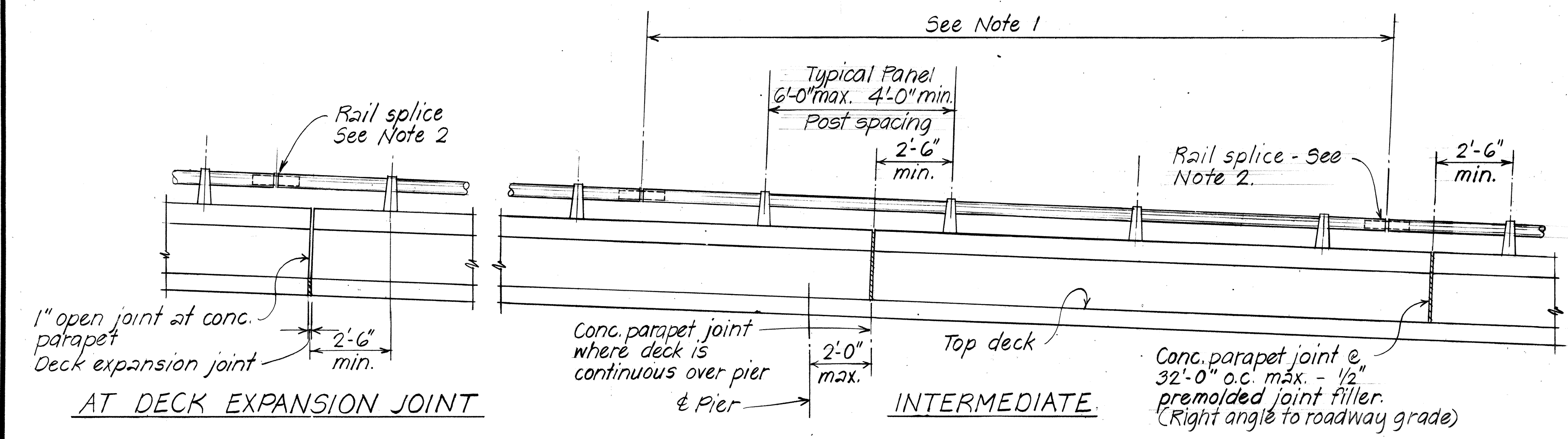
AT DECK EXPANSION JOINT

INTERMEDIATE

RAILING PLAN Scale: 3/8" = 1'-0"

NOTE

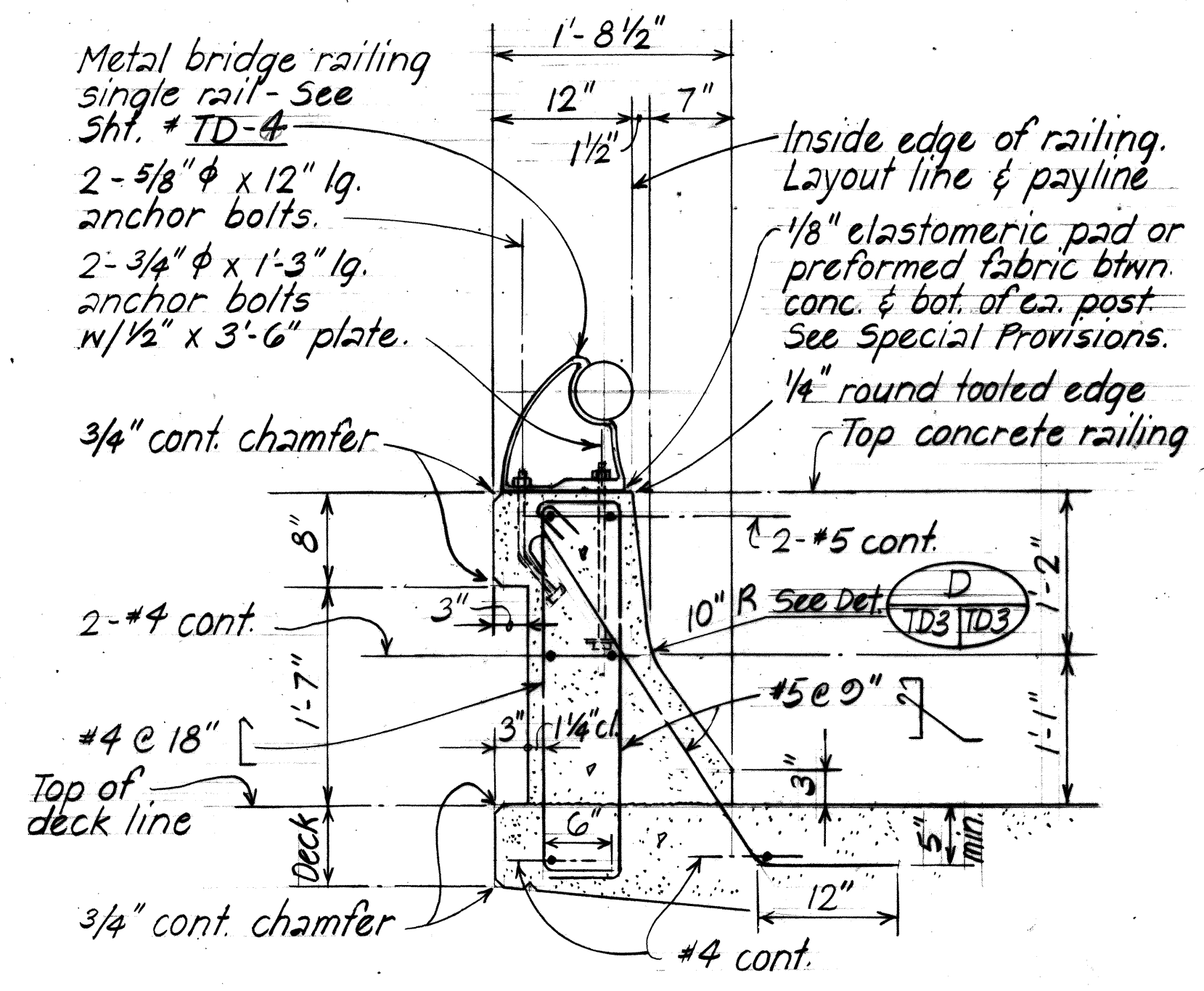
1. Tubing shall be continuous over not less than 4 post unless noted otherwise.
2. All rails shall be spliced in the panel spanning deck exp. joints. Increase joint width between tube to 1 1/2" and increase sleeve length by 1". (See tube splice detail, sht. # ID4.)
3. Rail post shall be normal to grade.
4. No more than one tube splice per panel shall be permitted except as noted.



AT DECK EXPANSION JOINT

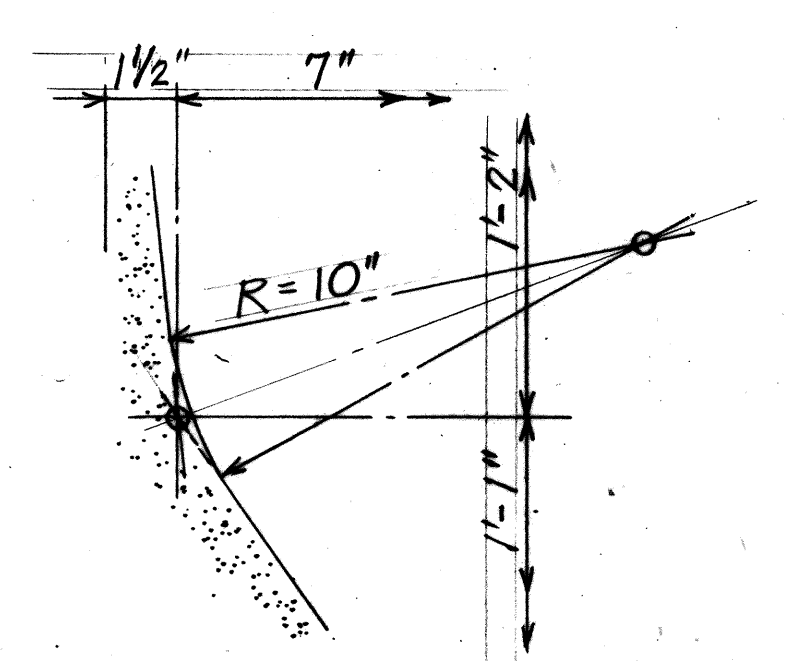
INTERMEDIATE

EXTERIOR RAILING ELEVATION Scale: 3/8" = 1'-0"



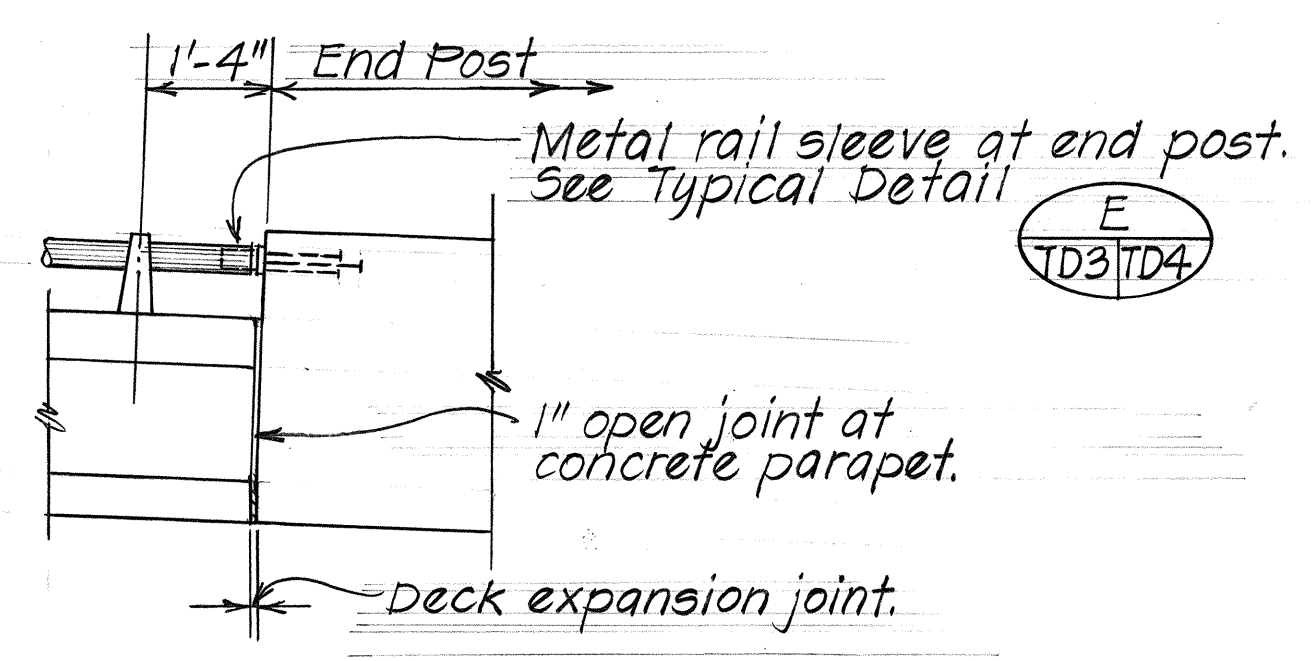
TYPICAL CONCRETE PARAPET SECTION

Scale: 1" = 1'-0"



DETAIL D

Scale: 3" = 1'-0"



E
TD3/TD4

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

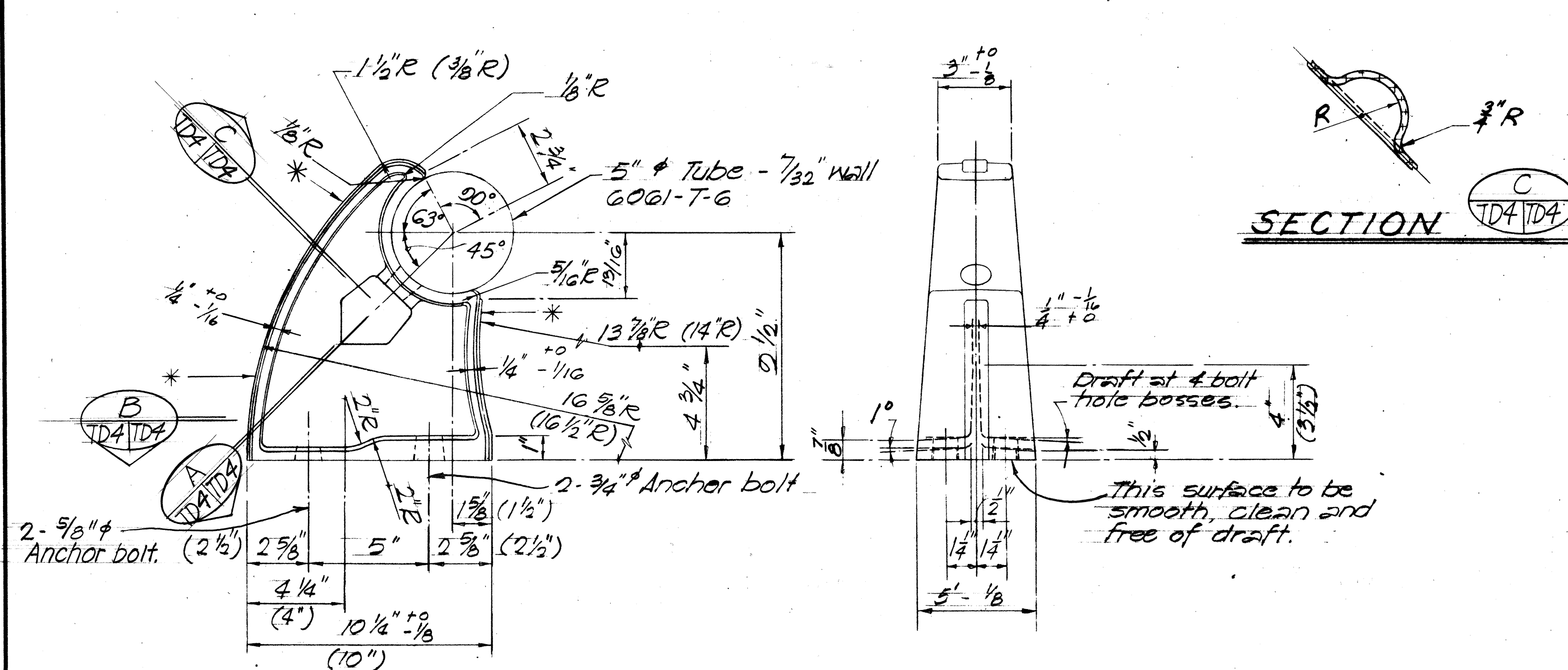
AAMANU STREAM BRIDGE

TYPICAL DETAILS
CONCRETE BRIDGE RAIL

HAWAII BELT ROAD
F.A. Proj. No. BRF-019-2(18)
Scale: As Noted Date:

SHEET No. TD3 OF TD5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	019-2(18)	1987	35	63



SIDE ELEVATION

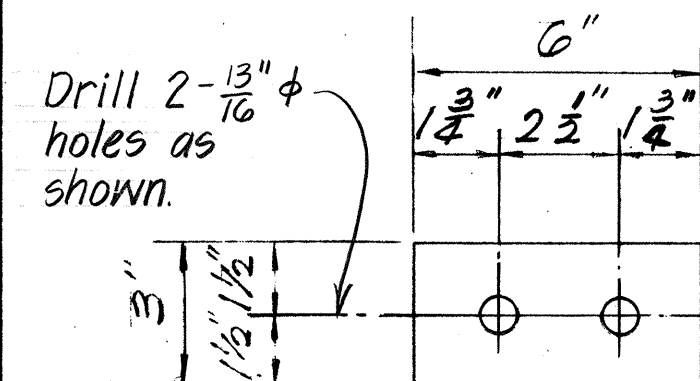
END ELEVATION

NOTE:
* Casting to be supplied with a standard scratch brush finish on entire gating rib surface and as indicated by an asterisk (*). Finish shall be approved by the Engineer.
Casting to be neatly trimmed and any protruding flash to be broken off. Unless otherwise specified, draft angles to be 3° corner radii to be 3/32" R, fillet radii to be 3/8" R, casting tol. to be ±1/16", wall thickness to be ±1/32". Dimensions may be as shown or as shown in parenthesis ().

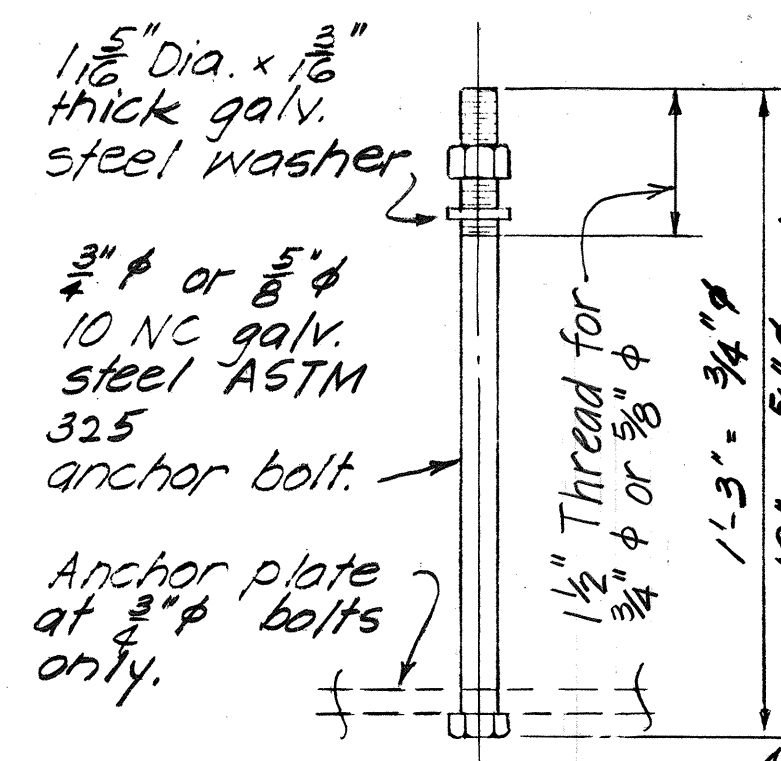
TYPICAL RAIL POST DETAILS

Scale: 3"=1'-0"

NOTE:
Anchor bolts shall be embedded such that the thread is excluded from the shear plane & approximately 2 threads are exposed above the nut.



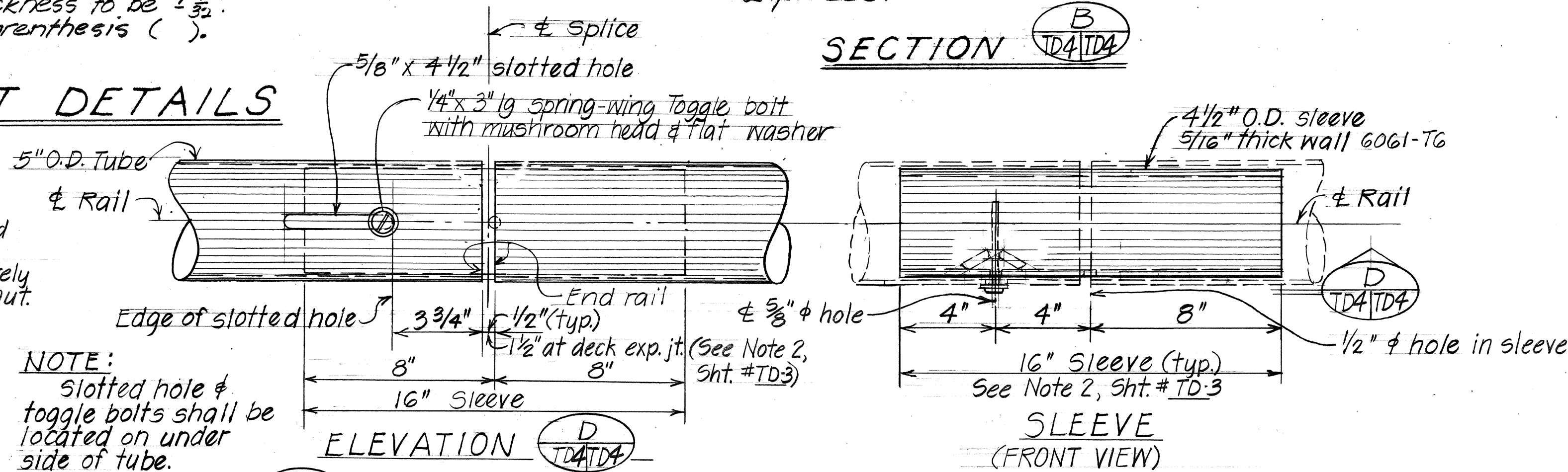
PLAN



ELEVATION

ANCHOR & DETAIL ANCHOR BOLT TYPICAL RAIL POST STEEL ANCHOR BOLT ASSEMBLY

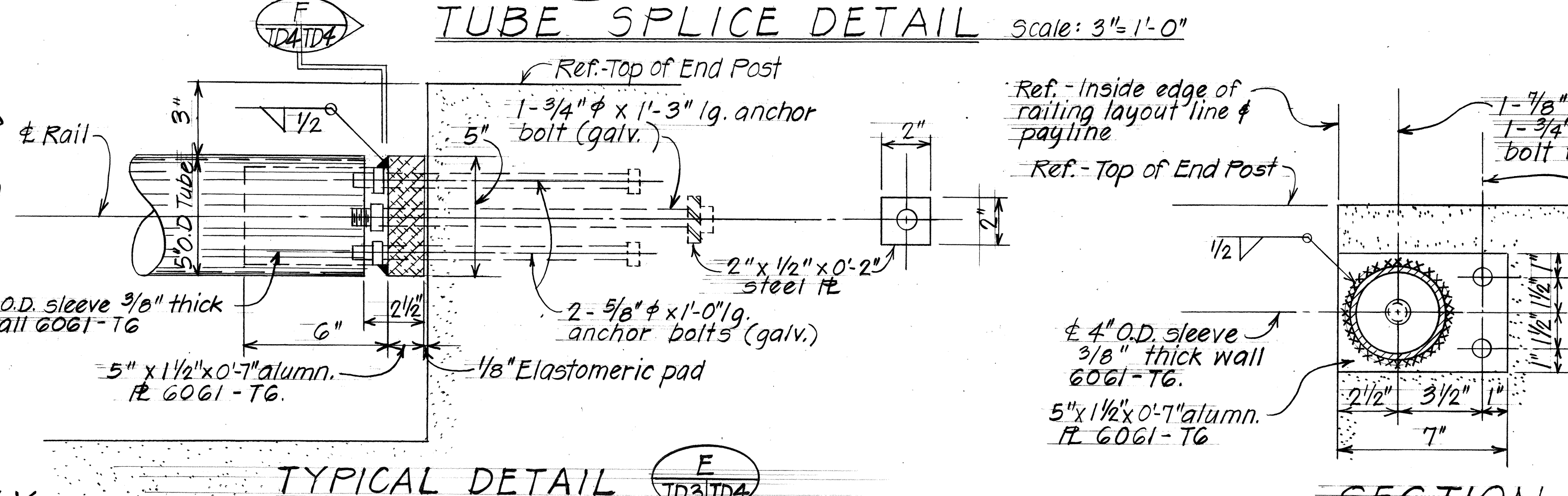
Scale: 3"=1'-0"



ELEVATION

TUBE SPLICE DETAIL

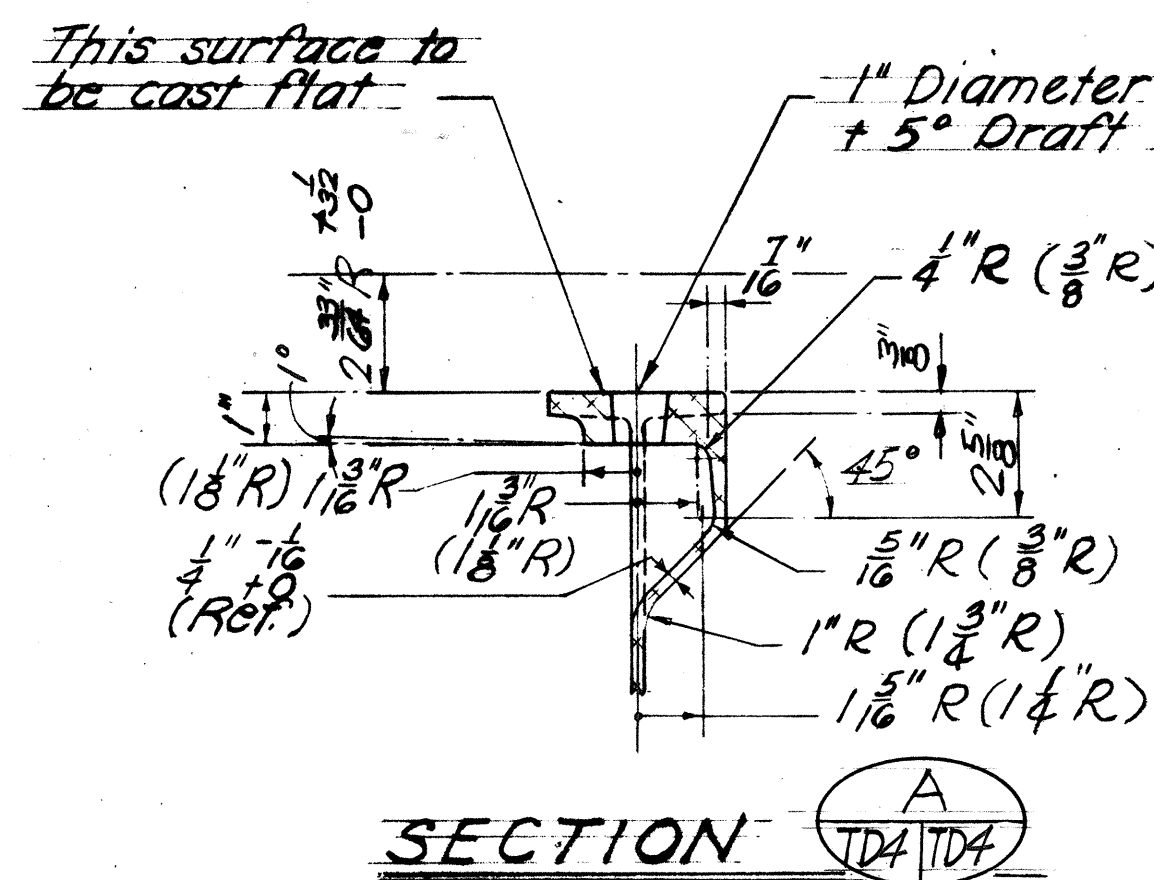
Scale: 3"=1'-0"



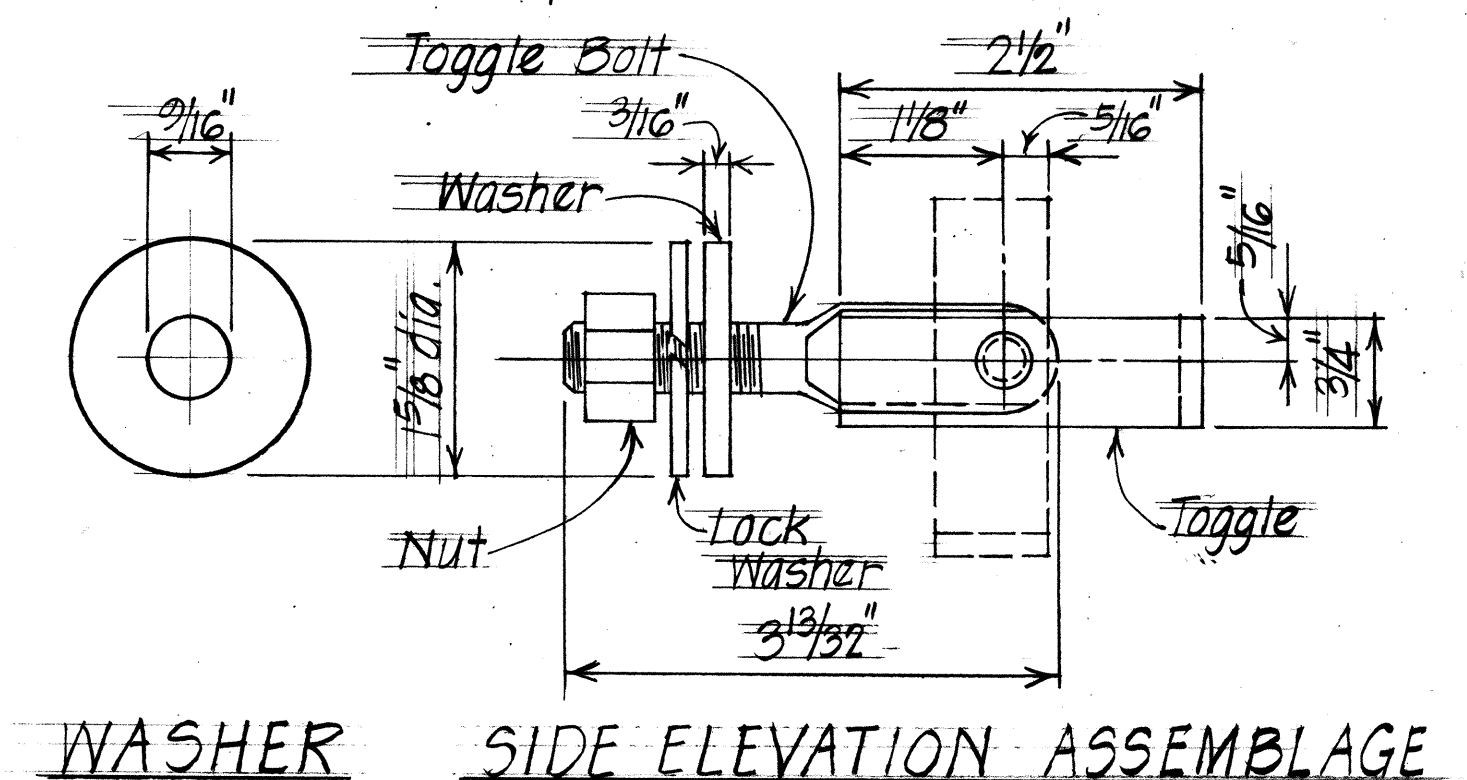
TYPICAL DETAIL

METAL RAIL SLEEVE AT END POST

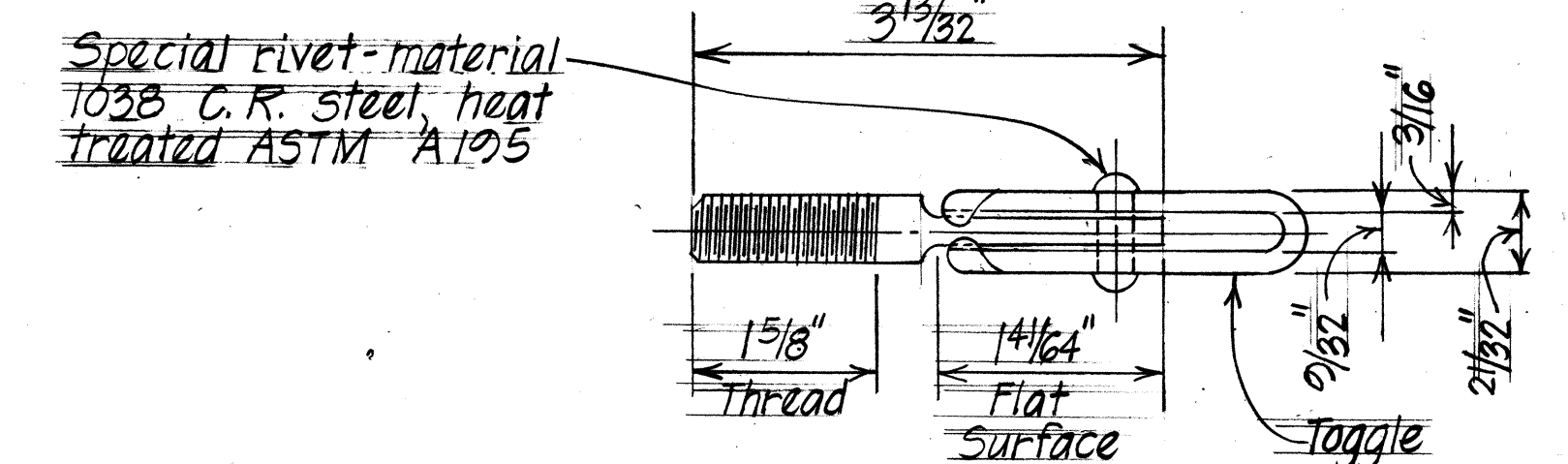
Scale: 3"=1'-0"



SECTION



WASHER SIDE ELEVATION ASSEMBLY



TOP PLAN

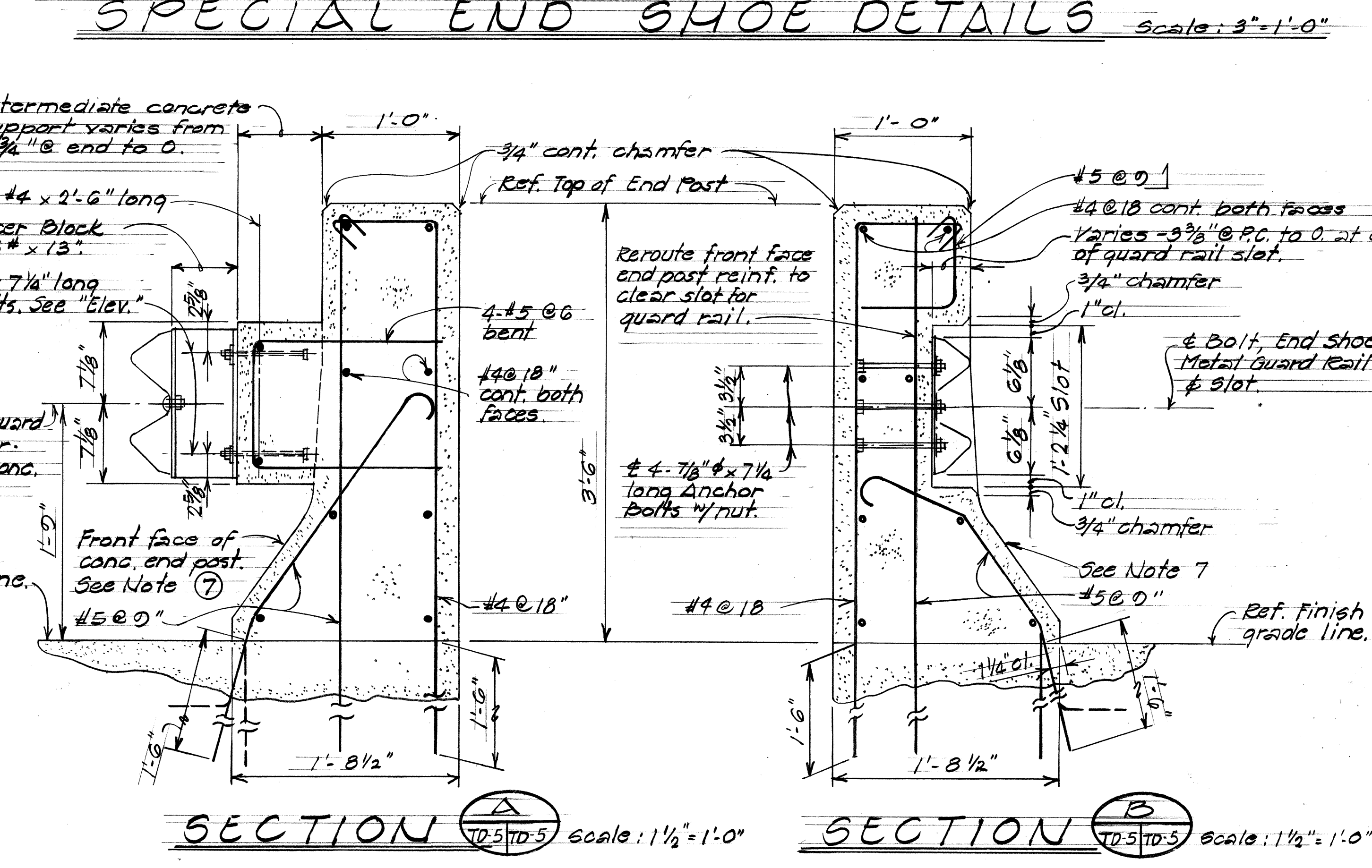
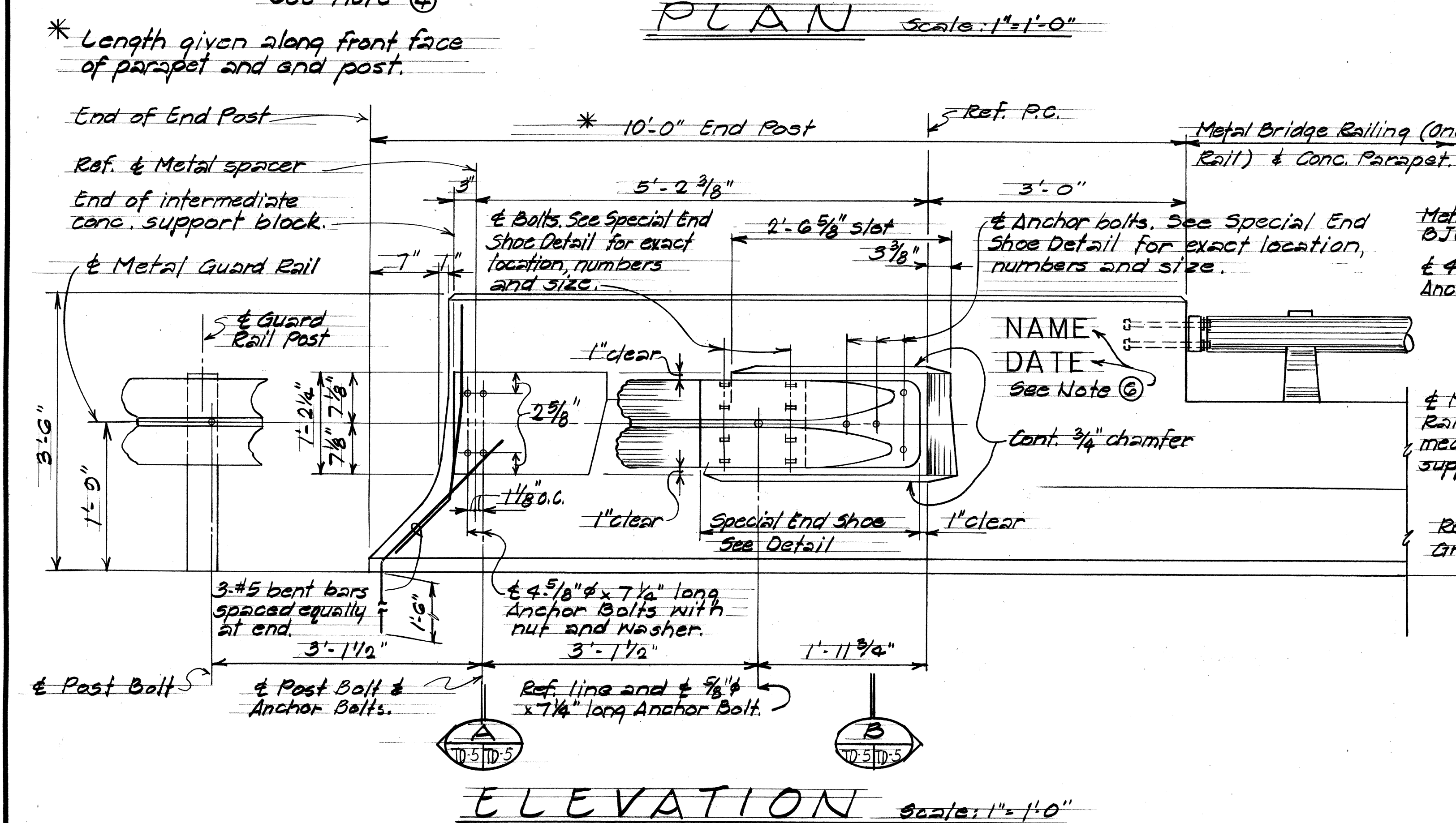
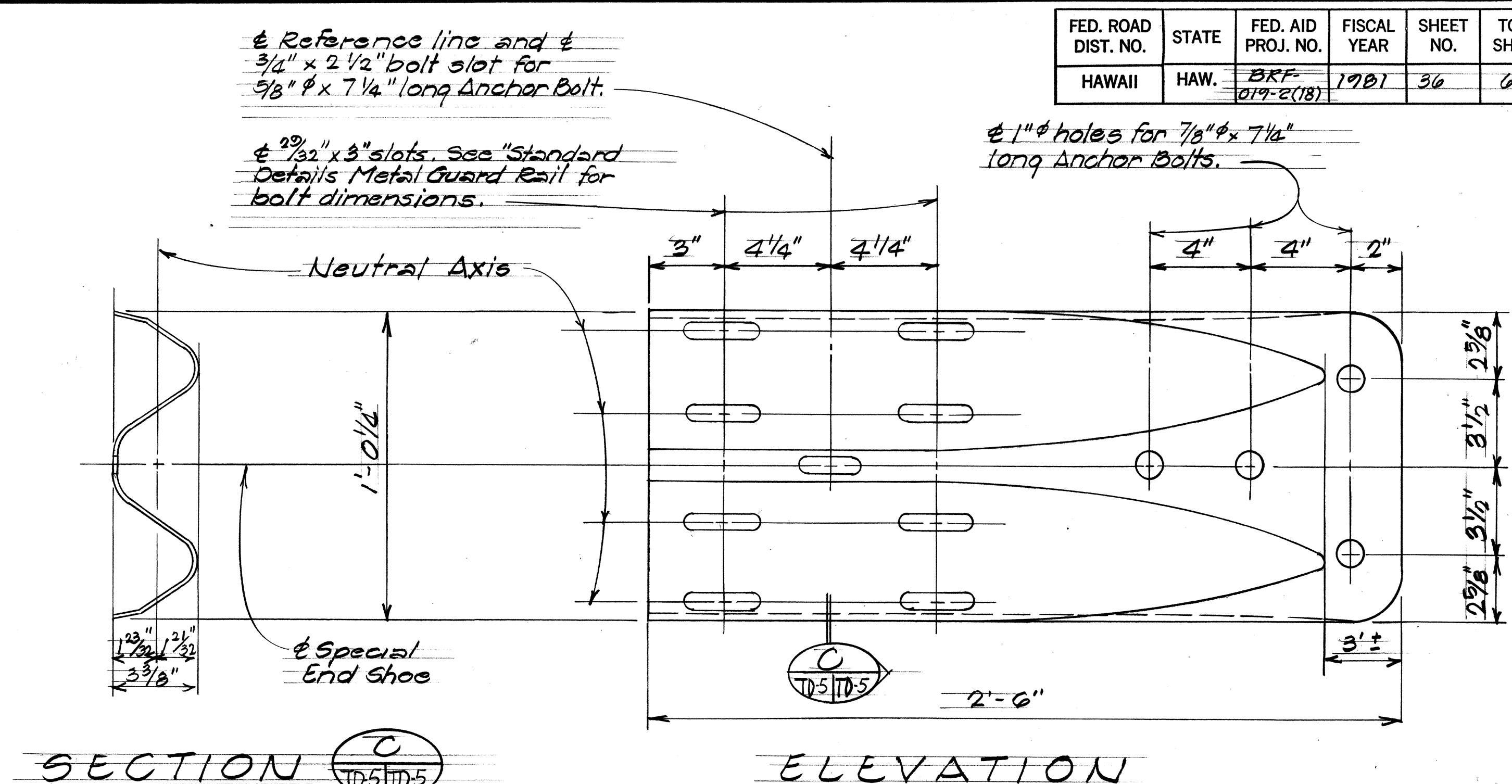
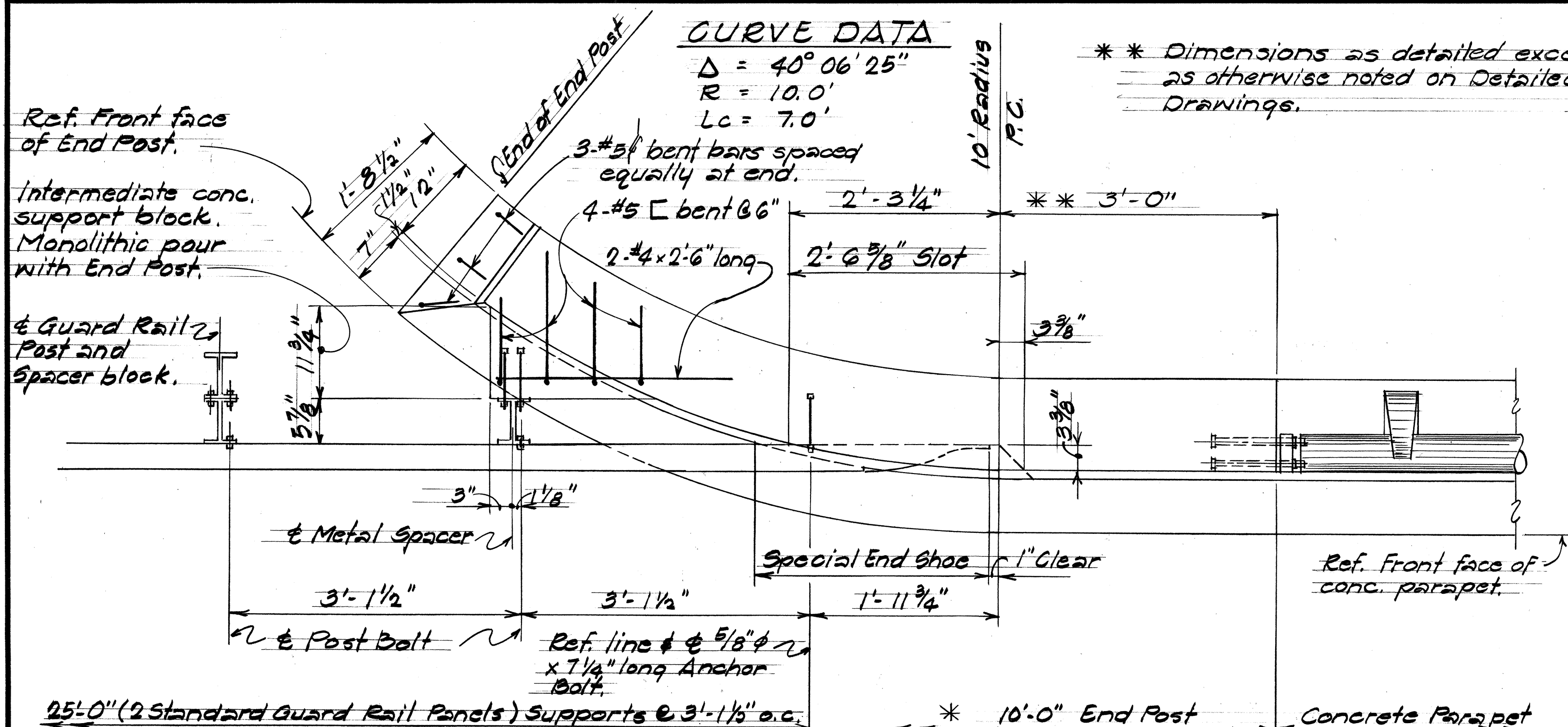
1/2" STEEL TOGGLE BOLT DETAIL

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
TYPICAL DETAILS
ALUMINUM BRIDGE RAILING
ONE RAIL COMBINATION TYPE
ON PARAPET

HAWAII BELT RD.
F.A. Proj. No. BRF-019-2(18)
Scale as noted Date:

SHEET No. TD4 OF TD5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(18)	1981	36	63



- NOTES:**
- All Anchor Bolts shall be High Strength bolts conforming to the requirements of ASTM A325.
 - All Shoe assembly, including anchor bolts, nuts and washers, shall be galvanized.
 - Special End Shoe shall be fabricated from 10 gauge steel conforming to the requirements of AASHTO '80.
 - First 25'-0" of guard rail adjoining "Special End Shoe" shall be galvanized steel.
 - Anchor Bolt length given from under bolt head.
 - Place name of structure as shown. For location, see "Plan" on Contract Drawing. Date shown will be year structure is completed. Letter size and detail see Standard Drawing DB-100.
 - Front face of End Post to match front face of typical conc. parapet.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL DETAILS
METAL GUARD RAIL CONNECTION
ONE RAIL COMBINATION TYPE END POST

HAWAII BELT RD.
F.A. Proj. No. BRF-019-2(18)
Scale: As shown Date: _____

SHEET NO. 36 OF 63 SHEETS